NASA/TM—2006–214379

FY 2004 Scientific and Technical Reports, Articles, Papers, and Presentations

Compiled by
B.A. Fowler
Marshall Space Flight Center, Marshall Space Flight Center, Alabama

May 2006

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FOREWORD

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Since July 1, 1960, when MSFC was organized, the reporting of scientific and engineering information has been considered a prime responsibility of the Center. Our credo has been that "research and development work is valuable, but only if its results can be communicated and made understandable to others."

GEORGE C. MARSHALL SPACE FLIGHT CENTER
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FY 2004 SCIENTIFIC AND TECHNICAL REPORTS,
ARTICLES, PAPERS, AND PRESENTATIONS

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TM—2003–212926 October 2003

Spray Bar Zero-Gravity Vent System for On-Orbit Liquid Hydrogen Storage. L.J. Hastings,* R.H. Flachbart, J.J. Martin, A. Hedayat, M. Fazah, T. Lak,** H. Nguyen,** and J.W. Bailey***. Vehicle and Systems Development Department, Space Transportation Directorate, *Alpha Technology, Inc., **The Boeing Company, and ***Sverdrup Technology, Inc.

During zero-gravity orbital cryogenic propulsion operations, a thermodynamic vent system (TVS) concept is expected to maintain tank pressure control without propellant resettling. In this case, a longitudinal spray bar mixer system, coupled with a Joule-Thompson (J-T) valve and heat exchanger, was evaluated in a series of TVS tests using the 18-m^3 multipurpose hydrogen test bed. Tests performed at fill levels of 90, 50, and 25 percent, coupled with heat tank leaks of about 20 and 50 W, successfully demonstrated tank pressure control within a 7-kPa band. Based on limited testing, the presence of helium constrained the energy exchange between the gaseous and liquid hydrogen (LH_2) during the mixing cycles. A transient analytical model, formulated to characterize TVS performance, was used to correlate the test data. During self-pressurization cycles following tank lockup, the model predicted faster pressure rise rates than were measured; however, once the system entered the cyclic self-pressurization/mixing/venting operational mode, the modeled and measured data were quite similar. During a special test at the 25-percent fill level, the J-T valve was allowed to remain open and successfully reduced the bulk LH_2 saturation pressure from 133 to 70 kPa in 188 min.

TM—2003–212930 November 2003

Overview of Nonnuclear Testing of the Safe, Affordable 30-kW Fission Engine, Including End-to-End Demonstrator Testing. M.K. Van Dyke, J.J. Martin, and M.G. Houts. Propulsion Research Center, Space Transportation Directorate.

Successful development of space fission systems will require an extensive program of affordable and realistic testing. In addition to tests related to design/development of the fission system, realistic testing of the actual flight unit must also be performed. At the power levels under consideration (3–300 kW electric power), almost all technical issues are thermal or stress related and will not be strongly affected by the radiation environment. These issues can be resolved more thoroughly, less expensively, and in a more timely fashion with nonnuclear testing, provided it is prototypic of the system in question. This approach was used for the safe, affordable fission engine test article development program and accomplished via cooperative efforts with Department of Energy labs, industry, universities, and other NASA Centers. This Technical Memorandum covers the analysis, testing, and data reduction of a 30-kW simulated reactor as well as an end-to-end demonstrator, including a power conversion system and an electric propulsion engine, the first of its kind in the United States.

TM—2003–212932 December 2003

Biological and Physical Space Research Laboratory Science Review 2002. P.A. Curreri, M.B. Robinson, and K.L. Murphy, Editors. Biological and Physical Space Research Laboratory, Science Directorate.

Documentation of the internal science research at the Biological and Physical Space Research Laboratory as presented in a review to Dr. Ann Whitaker, MSFC Science Director, in July 2002. These presentations have been revised and updated as appropriate for this report. The report documents flight and ground experiments in microgravity materials science and biotechnology science and space radiation. All of the work described includes significant scientific contributions by internal scientists (uusally as principal or co-investigator on the research grant). Much of the research is in collaboration with external scientists. All the funding was provided as the result of competitive proposals evaluated by internal or external peer review processes. The external flight and ground research that our laboratory supports for the NASA program will be reviewed in a separate report.

TM—2003–212933 December 2003

FY 2002 Scientific and Technical Reports, Articles, Papers, and Presentations. B.A. Fowler, Compiler. Office of Chief Information Officer, Center Operations Directorate.

This Technical Memorandum (TM) presents formal NASA technical reports, papers published in technical journals, and presentations by MSFC personnel in FY 2002. It also includes papers of MSFC contractors.

After being announced in STAR, all NASA series reports may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

The information in this TM may be of value to the scientific and engineering community in determining what information has been published and what is available.

TM—2003–212934 December 2003

Thermal and Chemical Characterization of Composite Materials (MSFC Center Director's Discretionary Fund Final Report, Project No. ED36–18). D.C. Stanley and T.L. Huff. Materials, Processes, and Manufacturing Department, Engineering Directorate.

The purpose of this research effort was to (1) provide a concise and well-defined property profile of current and developing composite materials using thermal and chemical characterization techniques and (2) optimize analytical testing requirements of materials. This effort applied a diverse array of methodologies to ascertain composite material properties.

Often, a single method or technique will provide useful, but nonetheless incomplete, information on material composition and/or behavior. To more completely understand and predict material properties, a broad-based analytical approach is required. By developing a database of information comprised of both thermal and chemical properties, material behavior under varying conditions may be better understood. This is even more important in the aerospace community, where new composite materials and those in the development stage have little reference data. For example, Fourier transform infrared (FTIR) spectroscopy spectral databases available for identification of vapor phase spectra, such as those generated during experiments, generally refer to well-defined chemical compounds. Because this method renders a unique thermal decomposition spectral pattern, even larger, more diverse databases, such as those found in solid and liquid phase FTIR spectroscopy libraries, cannot be used. By combining this and other available methodologies, a database specifically for new materials and materials being developed at Marshall Space Flight Center can be generated. In addition, characterizing materials using this approach will be extremely useful in the verification of materials and identification of anomalies in NASA-wide investigations.

TM—2004–213170 May 2004

Design Development Analyses in Support of a Heat Pipe-Brayton Cycle Heat Exchanger. B.E. Steeve and R.J. Kapernick*. Structures, Mechanics, and Thermal Department, Engineering Directorate, and Los Alamos National Laboratory.

A heat pipe-cooled reactor coupled to a Brayton cycle is currently under consideration for nuclear electric propulsion or as a planetary surface power source. In this system, power is transferred from the heat pipes to the Brayton gas via a heat exchanger attached to the heat pipes. This Technical Memorandum (TM) discusses the fluid, thermal, and structural analyses that were performed in support of the design of the heat exchanger to be tested in the Safe, Affordable Fission Engine experimental program at Marshall Space Flight Center. A companion paper, "Mechanical Design and Fabrication of a SAFE–100 Heat Exchanger for use in NASA's Advanced Propulsion Thermal-Hydraulic Simulator," presents the fabrication issues and prototyping studies that, together with these analyses, led to the development of this heat exchanger. An important consideration throughout the design development of the heat exchanger was its capability to be used for higher power and temperature applications. This TM also discusses this aspect of the design and presents designs for specific applications under consideration.

TM—2004–213172 May 2004

Evaluation of Training Samples Manually Welded With the Universal Handtool in a Space Simulation Chamber. C.K. Russell, T.W. Malone, and S.N. Cato. Materials, Processes, and Manufacturing Department, Engineering Directorate.

The international space welding experiment was designed to evaluate the universal handtool (UHT) functions as a welding, brazing, coating, and cutting tool for in-space operations. The UHT is an electron beam welding system developed by the Paton Welding Institute (PWI), Kiev, Ukraine, and operated at 8 kV with up to 1 kW of power. In preparation for conducting the space welding experiment, cosmonauts were trained to properly operate the UHT and correctly process samples.

This Technical Memorandum presents the results of the destructive and nondestructive evaluation of the training samples made in Russia in 1998. It was concluded that acceptable welds can be made with the UHT despite the constraints imposed by a space suit. The lap joint fillet weld configuration was more suitable than the butt joint configuration for operators with limited welding experience. The tube braze joint configuration designed by the PWI was easily brazed in a repeatable manner.

TM—2004–213174 May 2004

STARSAT: A Project To Evaluate Ground Tracking of Small Objects in Space (MSFC Center Director's Discretionary Fund Final Report, Project No. 00–11). J.W. Campbell, M.R. Carruth, and T.M. Freestone. Materials, Processes, and Manufacturing Department, Engineering Directorate.

A laser space calibration experiment is considered using the 12-J, 15-Hz high-performance CO_2 ladar surveillance sensor (HI-CLASS) system on the 3.67-m aperture advanced electro-optics system (AEOS). The objectives are to provide accurate range and signature measurements of orbiting calibration spheres, demonstrate high-resolution tracking capability of small objects, and precision drag determination for low-Earth orbit (LEO). Ancillary benefits include calibrating radar and optical sites, completing satellite conjunction analyses, supporting orbital perturbation analyses, and comparing radar and optical signatures. A global positioning system (GPS), laser beacon instrumented microsatellite about 25 cm in diameter will be deployed from a Space Shuttle Hitchhiker canister or other suitable launch means. Orbiting in LEO, the microsatellite will pass over AEOS on the average of two times per 24-hr period. An onboard orbit propagator will activate the GPS unit and a visible laser beacon at the appropriate times. The HI-CLASS AEOS will detect the microsatellite as it rises above the horizon, using Space Command-generated acquisition vectors. GPS data will be transmitted to the ground providing independent on-orbit, submeter accuracy location information for the microsatellite.

TM—2004–213175 May 2004

Analytical Modeling and Test Correlation of Variable Density Multilayer Insulation for Cryogenic Storage. L.J. Hastings,* A Hedayat, and T.M. Brown. Vehicle and Systems Development Department, Space Transportation Directorate and *Alpha Technology, Inc.

A unique foam/multilayer insulation (MLI) combination concept for orbital cryogenic storage was experimentally evaluated using a large-scale hydrogen tank. The foam substrate insulates for ground-hold periods and enables a gaseous nitrogen purge as opposed to helium. The MLI, designed for an on-orbit storage period for 45 days, includes several unique features including a variable layer density and larger but fewer perforations for venting during ascent to orbit. Test results with liquid hydrogen indicated that the MLI weight or tank heat leak is reduced by about half in comparison with standard MLI. The focus of this effort is on analytical modeling of the variable density MLI (VD-MLI) on-orbit performance. The foam/VD-MLI model is considered to have five segments. The first segment represents the optional foam layer. The second, third, and fourth segments represent three different MLI layer densities. The last segment is an environmental boundary or shroud that surrounds the last MLI layer. Two approaches are considered: a variable density MLI modeled layer by layer and a semiempirical model or "modified Lockheed equation." Results from the two models were very comparable and were within 5–8 percent of the measured data at the 300 K boundary condition.

TM—2004–213282 June 2004

Solid Rocket Booster Hydraulic Pump Port Cap Joint Load Testing. W.R. Gamwell and N.C. Murphy. Materials, Processes, and Manufacturing Department, Engineering Directorate.

The solid rocket booster uses hydraulic pumps fabricated from cast C355 aluminum alloy, with 17–4 PH stainless steel pump port caps. Corrosion-resistant steel, MS51830 CA204L self-locking screw thread inserts are installed into C355 pump housings, with A286 stainless steel fasteners installed into the insert to secure the pump port cap to the housing. In the past, pump port cap fasteners were installed to a torque of 33 Nm (300 in-lb). However, the structural analyses used a significantly higher nut factor than indicated during tests conducted by Boeing Space Systems. When the torque values were reassessed using Boeing's nut factor, the fastener preload had a factor of safety of <1, with potential for overloading the joint. This paper describes how behavior was determined for a preloaded joint with a steel bolt threaded into steel inserts in aluminum parts. Finite element models were compared with test results. For all initial bolt preloads, bolt loads increased as external applied loads increased. For higher initial bolt preloads, less load was transferred into the bolt, due to external applied loading. Lower torque limits were established for pump port cap fasteners and additional limits were placed on insert axial deformation under operating conditions after seating the insert with an initial preload.

TM—2004–213283 June 2004

NASA Marshall Space Flight Center Barrel-Shaped Asymmetrical Capacitor. J.W. Campbell, M.R. Carruth, D.L. Edwards, A. Finchum, G. Maxwell, S. Nabors, L. Smalley,* D. Huston,** D. Ila,** R. Zimmerman,** C. Muntele,** and I. Muntele.** Advanced Projects Office, Flight Projects Directorate, *The University of Alabama in Huntsville, and **Alabama A&M University.

The NASA Barrel-Shaped Asymmetrical Capacitor (NACAP) has been extensively tested at NASA Marshall Space Flight Center and the National Space Science and Technology Center. Trichel pulse emission was first discovered here. The NACAP is a magnetohydrodynamic device for electric propulsion. In air it requires no onboard propellant nor any moving parts. No performance was observed in hard vacuum. The next step shall be optimizing the technology for future applications.

TM—2004–213286 June 2004

The Geostationary Operational Environmental Satellite (GOES) Product Generation System. S.L. Haines, R.J. Suggs, and G.J. Jedlovec. Earth Science Department, Science Directorate.

The Geostationary Operational Environmental Satellite (GOES) Product Generation System (GPGS) is introduced and described. GPGS is a set of computer programs developed and maintained at the Global Hydrology and Climate Center and is designed to generate meteorological data products using visible and infrared measurements from the GOES-East Imager and Sounder instruments. The products that are produced by GPGS are skin temperature, total precipitable water, cloud top pressure, cloud albedo, surface albedo, and surface insolation. A robust cloud mask is also generated. The retrieval methodology for each product is described to include algorithm descriptions and required inputs and outputs for the programs. Validation is supplied where applicable.

TM—2004–213393 September 2004

X-Ray Calibration Facility/Advanced Video Guidance Sensor Test. N.A.S. Johnston, R.T. Howard, and D.W. Watson. Avionics Department, Engineering Directorate.

The advanced video guidance sensor was tested in the X-Ray Calibration facility at Marshall Space Flight Center to establish performance during vacuum. Two sensors were tested

and a timeline for each are presented. The sensor and test facility are discussed briefly. A new test stand was also developed. A table establishing sensor bias and spot size growth for several ranges is detailed along with testing anomalies.

TM—2004–213394 September 2004

Science Directorate Publications and Presentations, January 1–December 31, 2003. Compiled by F.G. Summers. Business Management Office, Science Directorate.

This Technical Memorandum (TM) lists the significant publications and presentations of the Science Directorate during the period January 1–December 31, 2003. Entries in the main part of the TM are categorized according to NASA Reports (arranged by report number), Open Literature and Presentations (arranged alphabetically by title). Most of the articles listed under Open Literature have appeared in refereed professional journals, books, monographs, or conference proceedings. Although many published abstracts are eventually expanded into full papers for publication in scientific and technical journals, they are often sufficiently comprehensive to include the significant results of the research reported. Therefore, published abstracts are listed separately in a subsection under Open Literature. Questions or requests for additional information about the entries in this TM should be directed to Dr. A.F. Whitaker (SD01; 544–2481) or to one of the authors.

TP—2003–212691 November 2003

Conceptual Design of In-Space Vehicles for Human Exploration of the Outer Planets. R.B. Adama, R.A. Alexander, J.M. Chapman, S.S. Fincher, R.C. Hopkins, A.D. Philips, T.T. Polsgrove, R.J. Litchford, B.W. Patton, G. Statham,* P.S. White,* and Y.C.F. Thio**. Program Planning and Development Office, Space Transportation Directorate, *ERC, Inc., and U.S. Department of Energy.

During fiscal year 2002, a team of engineers from TD30/ Advanced Concepts and TD40/Propulsion Research Center embarked on a study of potential crewed missions to the outer solar system. This study was conducted under the auspices of the Revolutionary Aerospace Systems Concepts activity administered by Langley Research Center (LaRC). The Marshall Space Flight Center (MSFC) team interacted heavily with teams from other Centers, including Glenn Research Center, LaRC, Jet Propulsion Laboratory, and Johnson Space Center. The MSFC team generated five concept missions for this project. The concept missions use a variety of technologies, including magnetized target fusion (MTF), magnetoplasmadynamic thrusters, solid core reactors, and molten salt reactors in various combinations. This Technical Publication (TP) reviews these five concepts and the methods used to generate them. The analytical methods used are described for all significant disciplines and subsystems. The propulsion and power technologies selected for each vehicle are reviewed in detail. The MSFC team also expended considerable effort refining the MTF concept for use with this mission. The results from this effort are also contained within this TP. Finally, the lessons learned from this activity are summarized in the conclusions section.

TP—2003–212927 November 2003

Gauging the Nearness and Size of Cycle Maximum. Robert M. Wilson and David H. Hathaway. Space Science Department, Science Directorate.

A simple method for monitoring the nearness and size of conventional cycle maximum for an ongoing sunspot cycle is examined. The method uses the observed maximum daily value and the maximum monthly mean value of international sunspot number and the maximum value of the 2-mo moving average of monthly mean sunspot number to effect the estimation. For cycle 23, a maximum daily value of 246, a maximum monthly mean of 170.1, and a maximum 2-mo moving average of 148.9 were each observed in July 2000. Taken together, these values strongly suggest that conventional maximum amplitude for cycle 23 would be ≈124.5, occurring near July 2002 ±5 mo, very close to the now well-established conventional maximum amplitude and occurrence date for cycle 23—120.8 in April 2000.

TP—2003–212929 November 2003

Nucleation Behavior of Oxygen-Acetylene Torch-Produced Diamond Films. F.E. Roberts. Materials, Processes, and Manufacturing Department, Engineering Directorate.

A mechanism is presented for the nucleation of diamond in the combustion flame environment. A series of six experiments and two associated simulations provide results from which the mechanism was derived. A substantial portion of the prior literature was reviewed and the data and conclusions from the previous experimenters were found to support the proposed mechanism. The nucleation mechanism builds on the work of previous researchers but presents an approach to nucleation in a detail and direction not fully presented heretofore. This work identifies the gas phase as the controlling environment for the initial formulation steps leading to nucleation. The development mechanism explains some of the difficulty which has been found in producing single crystal epitaxial films.

An experiment which modified the initial gas phase precursor using methane and carbon monoxide is presented. Addition of methane into the precursor gases was found to be responsible for pillaring of the films. Atomoic force microscopy surface roughness data provided a reasonable look at suppression of nucleation by carbon monoxide. Surface finish data was taken on crystals which were open to the nucleation environment and generally parallel to the substrate surface. These surfaces were measured as an independent measure of the instantaneous nucleation environment. A gas flow and substrate experiment changed the conditions on the surface of the sample by increasing the gas flow rate while remaining on a consistent point of the atomic constituent diagram, and by changing the carbide potential of the substrate. Two tip modification experiments looked at the behavior of gas phase nucleation by modifying the shape and behavior of the flame plasma in which the diamond nucleation is suspected to occur. Diamond nucleation and growth was additionally examined using a high-velocity oxygen fuel gun and C_3H_6 as the fuel gas phase precursor with addition of carbon monoxide gas or addition of liquid toluene.

TP—2004–213089 July 2004

Survey of Technologies Relevant to Defense From Near-Earth Objects. R.B. Adams, R.A. Alexander, J. Bonemetti, J.M. Chapman, S.S. Fincher, R.C. Hopkins, M. Kalkstein, T.T. Polsgrove, G. Statham,* and P.S. White*. Advanced Concepts Department, Space Transportation Directorate, and *ERC, Inc.

Several recent near-miss encounters with asteroids and comets have focused attention on the threat of a catastrophic impact with the Earth. This Technical Publication reviews the historical impact record and current understanding of the number and location of near-Earth objects (NEOs) to address their impact probability. Various ongoing projects intended to survey and catalog the NEO population are also reviewed. Details are

given of a Marshall Space Flight Center-led study intended to develop and assess various candidate systems for protection of the Earth against NEOs. Details of analytical tools, trajectory tools, and a tool that was created to model both the undeflected inbound path of an NEO as well as the modified, postdeflection path are given. A representative selection of these possible options was modeled and evaluated. It is hoped that this study will raise the level of attention about this very real threat and also demonstrate that successful defense is both possible and practicable, provided appropriate steps are taken.

TP—2004–213143 April 2004

Plasma Sail Concept Fundamentals. G.V. Khazanov, P. Delamere,* K. Kabin,** and T.J. Linde***. Space Science Department, Science Directorate, *University of Colorado, **University of Alberta, and ***The University of Chicago.

The mini-magnetospheric plasma propulsion (M2P2) dvice, originally proposed by Winglee et al., predicts that a 15-km standoff distance (or 20-km cross-sectional dimension) of the magnetic bubble will provide for sufficient momentum transfer from the solar wind to accelerate a spacecraft to unprecedented speeds of 50–80 km/s after an acceleration period of ≈3 mo. Such velocities will enable travel out of the solar system in a period of ≈7 yr—almost an order of magnitude improvement over present chemical-based propulsion systems. However, for the parameters of the simulation of Winglee et al., a fluid model for the interaction of M2P2 with the solar wind is not valid. It is assumed in the magnetohydrodynamic (MHD) fluid model, normally applied to planetary magnetospheres, that the characteristic scale size is much greater than the Larmor radius and ion skin depth of the solar wind. In the case of M2P2, the size of the magnetic bubble is actually less than or comparable to the scale of these characteristic parameters. Therefore, a kinetic approach, which addresses the small-scale physical mechanisms, must be used. A two-component approach to determining a preliminary estimate of the momentum transfer to the plasma sail has been adopted. The first component is a self-consistent MHD simulation of the small-scale expansion phase of the magnetic bubble. The fluid treatment is valid to roughly 5 km from the source and the steady-state MHD solution at the 5 km boundary was then used as initial conditions for the hybrid simulation. The hybrid simulations showed that the forces delivered to the innermost regions of the plasma sail are considerably (≈10 times) smaller than the MHD counterpart, are dominated by the magnetic field pressure gradient, and are directed primarily in the transverse direction.

TP—2004–213173 May 2004

Performance Theory of Diagonal Conducting Wall Magnetohydrodynamic Accelerators. R.J. Litchford. Advanced Space Transportation Program, Space Transportation Directorate.

The theoretical performance of diagonal conducting wall crossed-field accelerators is examined on the basis of an infinite segmentation assumption using a cross-plane averaged generalized Ohm's law for a partially ionized gas, including ion slip. The desired accelerator performance relationships are derived from the cross-plane averaged Ohm's law by imposing appropriate configuration and loading constraints. A current-dependent effective voltage drop model is also incorporated to account for cold-wall boundary layer effects, including gasdynamic variations, discharge constriction, and electrode falls. Definition of dimensionless electric fields and current densities leads to the construction of graphical performance diagrams, which further illuminate the rudimentary behavior of crossed-field accelerator operation.

TP—2004–213281
June 2004

Application of the Maximum Amplitude-Early Rise Correlation to Cycle 23. Robert M. Wilson and David H. Hathaway. Space Science Department, Science Directorate.

On the basis of the maximum amplitude-early rise correlation, cycle 23 could have been predicted to be about the size of the mean cycle as early as 12 mo following cycle minimum. Indeed, estimates for the size of cycle 23 throughout its rise consistently suggested a maximum amplitude that would not differ appreciably from the mean cycle, contrary to predictions based on precursor information. Because cycle 23's average slope during the rising portion of the solar cycle measured 2.4, computed as the difference between the conventional maximum (120.8) and minimum (8) amplitudes divided by the ascent duration in months (47), statistically speaking, it should be a cycle of shorter period. Hence, conventional sunspot minimum for cycle 24 should occur before December 2006, probably near July 2006 (±4 mo). However, if cycle 23 proves to be a statistical outlier, then conventional sunspot minimum for cycle 24 would be delayed until after July 2007, probably near December 2007 (±4 mo). In anticipation of cycle 24, a chart and table are provided for easy monitoring of the nearness and size of its maximum amplitude once onset has occurred (with respect to the mean cycle and using the updated maximum amplitude-early rise relationship).

TP—2004–213284 June 2004

Toxic Gas Exposure Risks Associated With Potential Shuttle Catastrophic Failures. B. Jeffrey Anderson and Rebecca C. McCaleb. Engineering Systems Department, Engineering Directorate.

From early in the Shuttle program, the National Aeronautics and Space Administration has modeled hydrogen chloride (HCl) release by burning solid propellant in the solid rocket boosters. In 1998, the United States Air Force 45th Space Wing

instituted more stringent launch commit criteria (LCC) for the Titan and Delta vehicles and proposed that the same LCC be applied to the Shuttle to enhance safety of onsite visitors and offsite public. Two types of health and safety standards were applicable: (1) Expected casualties and risk and (2) air quality emergency response.

This study addresses the issues using the U.S. Environmental Protection Agency-recommended model, CALPUFF. Results were compared to those produced by the USAF model, REEDM, developed for projecting air quality from nominal launches. Model performance was also evaluated against results of a Kennedy Space Center-sponsored study at the Los Alamos National Laboratory (LANL) using a computer-intensive, wildfire model.

CALPUFF and the LANL model are capable of multipuff modeling of multiple sources. REEDM is a single-source, single-puff model. This study revealed significant deficiencies in REEDM when applied to the catastrophic failure problem. CALPUFF results indicate that, if a Shuttle abort were to occur over land, serious levels of HCl exposure could occur out to distances of at least 10 km, sufficient range to include major onsite visitor viewing areas. A preliminary survey of mitigation alternatives indicates cost-effective measures could be implemented that are sufficiently protective. Recent safety initiatives in response to the *Columbia* Accident Investigation Board report are not reflected here.

TP—2004–213338 August 2004

Displacement Damage Effects in Solar Cells—Mining Damage From the Microelectronics and Photonics Test Bed Space Experiment. R.J. Walters, T.L. Mortin,* and S.R. Messenger**. NASA's Space Environments and Effects (SEE) Program, *Ohio Aerospace Institute, and **SFA, Inc.

The objective is to develop an improved space solar cell radiation response analysis capability and to produce a computer modeling tool which implements the analysis. This was accomplished through analysis of solar cell flight data taken on the Microelectronics and Photonics Test Bed experiment. This effort specifically addresses issues related to rapid technological change in the area of solar cells for space applications in order to enhance system performance, decrease risk, and reduce cost for future misions.

TP—2004–213339 August 2004

Solar Variability and the Near-Earth Environment—Mining Enhanced Low Dose Rate Sensitivity Data From the Microelectronics and Photonics Test Bed Space Experiment. T. Turlinger, W. Schmeichel, J. Krieg, J. Titus, A. Campbell,* M. Reeves,* and P. Marshall**. NASA's Space Environments and Effects (SEE) Program, NAVSEA Crane, and the *Naval Research Laboratory.

This effort is a detailed analysis of existing microelectronics and photonics test bed satellite data from one experiment, the bipolar test board, looking to improve our understanding of the enhanced low dose rate sensitivity (ELDRS) phenomenon. Over the past several years, extensive total dose irradiations of bipolar devices have demonstrated that many of these devices exhibited ELDRS. In sensitive bipolar transistors, ELDRS produced enhanced degradation of base current, resulting in enhanced gain degradation at dose rates <0.1 rd(Si)/s compared to similar transistors irradiated at dose rates >1 rd(Si)/s. This Technical Publication provides updated information about the test devices, the in-flight experiment, and both flight-and ground-based observations. Flight data are presented for the past 5 yr of the mission. These data are compared to ground-based data taken on devices from the same date code lots. Information about temperature fluctuations, power shutdowns, and other variables encountered during the space flight are documented.

CP—2003–212931 November 2003

5th Conference on Aerospace Materials, Processes, and Environmental Technology. M.B. Cook and D. Cross Stanley, Editors. Materials, Processes, and Manufacturing Department, Engineering Directorate.

The next millennium challenges us to produce innovative materials, processes, manufacturing, and environmental technologies that meet low-cost aerospace transportation needs while maintaining U.S. leadership. The pursuit of advanced aerospace materials, manufacturing processes, and environmental technologies supports the development of safer, operational, next-generation, reusable, and expendable aeronautical and space vehicle systems. The Aerospace Materials, Processes, and Environmental Technology Conference provided a forum for manufacturing, environmental, materials, and processes engineers, scientists, and managers to describe, review, and critically assess advances in these key technology areas.

CP—2004–213090 March 2004

NASA Workshop on Technology for Human and Robotic Exploration and Development of Space. J.C. Mankins,* N. Marzwell,** C.A. Mullins,† C.B. Christensen,† J.T. Howell, and D.A. O'Neil. Advanced Projects Office, Flight Projects Directorate, *NASA Headquarters, **Jet Propulsion Laboratory, and †The Tauri Group.

Continued constrained budgets and growing interests in the industrialization and development of space requires NASA to seize every opportunity for assuring the maximum return on space infrastructure investments. This workshop provided an excellent forum for reviewing, evaluating, and updating pertinent strategic planning, identifying advanced concepts and high-risk/high-leverage research and technology requirements, developing strategies and roadmaps, and establishing approaches, methodologies, modeling, and tools for facilitating the commercial development of space and supporting diverse exploration and scientific missions. Also, the workshop adressed important topic areas including revolutionary space systems requiring investments in innovative advanced technologies; achieving transformational space operations through the insertion of new technologies; revolutionary science in space through advanced systems and new technologies enabling experiments to go anytime to any location; and, innovative and ambitious concepts and approaches essential for promoting advancements in space transportation. Details concerning the workshop process, structure, and results are contained in the ensuing report.

CP—2004–213091 March 2004

8th Spacecraft Charging Technology Conference. J.L. Minor, Compiler. NASA's Space Environments and Effects (SEE) Program.

The 8th Spacecraft Charging Technology Conference was held in Huntsville, Alabama, October 20–24, 2003. Hosted by NASA's Space Environments and Effects (SEE) Program and co-sponsored by the Air Force Research Laboratory (AFRL) and the European Space Agency (ESA), the 2003 conference saw attendance from eleven countries with over 65 oral papers and 18 poster papers in the areas of Plasma Propulsion and Tethers, Ground Testing Techniques, Interactions of Spacecraft and Systems With the Natural and Induced Plasma Environment, Materials Characterizations, Models and Computer Simulation, Environment Specifications, Current Collection and Plasma Probes in Space Plasmas, and On-Orbit Investigations. A round-table discussion of international standards regarding electrostatic discharge (ESD) testing was also held with the promise of continued discussions in the off years and an official continuation at the next conference.

CP—2004–213229 June 2004

Transformational Systems Concepts and Technologies for Our Future in Space. J.T. Howell, P. George,* J.C. Mankins,** and C.B. Christensen†. Advanced Projects Office, Flight Projects Directorate, *Glenn Research Center, **NASA Headquarters, and †The Tauri Group.

NASA is constantly searching for new ideas and approaches yielding opportunities for assuring maximum returns on space infrastructure investments. Perhaps the idea of transformational innovation in developing space systems is long overdue. However, the concept of utilizing modular space system designs combined with stepping-stone development processes has merit and promises to return several times the original investment since each new space system or component is not treated as a unique and/or discrete design and development challenge. New space systems can be planned and designed so that each builds on the technology of previous systems and provides capabilities to support future advanced systems. Subsystems can be designed to use common modular components and achieve economies of scale, production, and operation. Standards, interoperability, and "plug and play" capabilities, when implemented vigorously and consistently, will result in systems that can be upgraded effectively with new technologies. This workshop explored many building-block approaches via way of example across a broad spectrum of technology discipline areas for potentially transforming space systems and inspiring future innovation. Details describing the workshop structure, process, and results are contained in this Conference Publication.

CR—2003–212745 October 2003

Characterization of Magnetospheric Spacecraft Charging Environments Using the LANL Magnetospheric Plasma Analyzer Data Set. V.A. Davis, M.J. Mandell, and M.F. Thomsen. NASA's Space Environments and Effects (SEE) Program, Science Applications International Corporation.

An improved specification of the plasma environment has been developed for use in modeling spacecraft charging. It was developed by statistically analyzing a large part of the LANL Magnetospheric Plasma Analyzer (MPA) data set for ion and electron spectral signature correlation with spacecraft charging, including anisotropies. The objective is to identify a relatively simple characterization of the full particle distribution that yield an accurate prediction of the observed charging under a wide variety of conditions.

CR—2004–213227 June 2004

Analysis of CRRES PHA Data for Low-Energy-Deposition Events. P.J. McNulty. NASA's Space Environments and Effects (SEE) Program, Clemson University.

This effort analyzed the low-energy deposition Pulse Height Analyzer (PHA) data from the Combined Release and Radiation Effects Satellite (CRRES). The high-energy deposition data had been previously analyzed and shown to be in agreement with spallation reactions predicted by the Clemson University Proton Interactions in Devices (CUPID) simulation model and existing environmental and orbit positioning models (AP-8 with USAF B-L coordinates). The scope of this project was to develop and improve the CUPID model by increasing its range to lower incident particle energies, and to expand the modeling to include contributions from elastic interactions. Before making changes, it was necessary to identify experimental data suitable for benchmarking the codes; then, the models to the CRRES PHA data could be applied. It was also planned to test the model against available low-energy proton or neutron SEU data obtained with mono-energetic beams.

CR—2004–213228 June 2004

Mining CRRES IDM Pulse Data and CRRES Environmental Data to Improve Spacecraft Charging/Discharging Models and Guidelines. A.R. Frederickson and D.H. Brautigam*. NASA's Space Environments and Effects (SEE) Program, *Caltech Jet Propulsion Laboratory.

One can truly predict the charging and pulsing in space over a year's time using only the physics that worked for periods of an hour and less in prior publications. All portions of the task were achieved, including the optional portion of determining a value for conductivity that best fit the data.

Fortran statements were developed that are required for the NUMIT runs to work with this kind of data from space. In addition to developing the Fortran for NUMIT, simple correlations between the IDM pulsing history and the space radiation were observed because we now have a better characterization of the space radiation.

The study showed that: (1) the new methods for measurement of charge storage and conduction in insulators provide the correct values to use for prediction of charging and pulsing in space; (2) the methods in NUMIT that worked well for time durations less than hours now work well for durations of months; (3) an average spectrum such as AE8 is probably not a good guide for predicting pulsing in space—one must take time dependence into account in order to understand insulator pulsing; and (4) the old method for predicting pulse rates in space that was based on the CRRES data could be improved to include dependencies on material parameters.

CR—2004–213285 May 2004

The 2003 NASA Faculty Fellowship Program Research Reports. S.K. Nash-Stevenson, G. Karr,* and L.M. Freeman*** (Program Directors) and J. Bland (Compiler and Editor). Education Programs Department, Customer and Employee Relations Directorate, *The University of Alabama in Huntsville, and **The University of Alabama.

For the 39th consecutive year, the NASA Faculty Fellowship Program (NFFP) was conducted at Marshall Space Flight Center. The program was sponsored by NASA Headquarters, Washington, DC, and operated under contract by The University of Alabama in Huntsville. In addition, promotion and applications are managed by the American Society for Engineering Education (ASEE) and assessment is completed by Universities Space Research Association (USRA). The nominal starting and finishing dates for the 10-week program were May 27 through August 1, 2003. The primary objectives of the NASA Faculty Fellowship Program are to: (1) Increase the quality and quantity of research collaborations between NASA and the academic community that contribute to NASA's research objectives; (2) provide research opportunities for college and university faculty that serve to enrich their knowledge base; (3) involve students in cutting-edge science and engineering challenges related to NASA's strategic enterprises, while providing exposure to the methods and practices of real-world research; (4) enhance faculty pedagogy and facilitate interdisciplinary networking; (5) encourage collaborative research and technology transfer with other Government agencies and the private sector; and (6) establish an effective education and outreach activity to foster greater awareness of this program.

ABBAS, M.M. SD50
CRAVEN, P.D. SD50
SPANN, J.F. SD50
TANKOSIC, D. UAH
LECLAIR, A. UAH
GALLAGHER, D.L. SD50

Laboratory Experiments on Rotation of Micron Size Cosmic Dust Grains With Radiation—Abstract Only. For presentation at and publication in Proceedings of the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.

ABBAS, M.M. SD50
CRAVEN, P.D. SD50
SPANN, J.F. SD50
TANKOSIC, D. UAH
LECLAIR, A. UAH
GALLAGHER, D.L. SD50
WEST, E.A. SD50
WEINGARTNER, J.C. Mason University
WITHEROW, W.K. SD50

Laboratory Experiments on Rotation and Alignment of the Analogs of Interstellar Dust Grains by Radiation—Abstract Only. For publication in The Astrophysical Journal, 2004.

ABBAS, M.M. SD50
CRAVEN, P.D. SD50
SPANN, J.F. SD50
TANKOSIC, D. UAH
LECLAIR, A. UAH
WEST, E.A. SD50

Experiments on Dust Grain Charging—Abstract Only. For presentation at and publication in Proceedings of the American Geophysical Union 2004 Fall Annual Meeting, San Francisco, CA, December 13–17, 2004.

ABBAS, M.M. SD50
LECLAIR, A. UAH
OWEN, T. University of Hawaii
CONRATH, B.J. Cornell University
FLASAR, F.M. Goddard Space Flight Center
KUNDE, V.G. University of Maryland
NIXON, C.A. University of Maryland
ACHTERBERG, R.K. Science. Systems & Applications
BJORAKER, G. Goddard Space Flight Center
ET AL.

Nitrogen Isotopic Ratio in Jupiter's Atmosphere From Observations by Composite Infrared Spectrometer (CIRS) on the Cassini Spacecraft—Abstract Only. For publication in The Astrophysical Journal, 2004.

ADAMS, C.W. ED42
HAMILTON, G.S. ED42

Holistic Design for Total Product Well Being—Abstract Only. For presentation at the Human Factors & Ergonomics Society, New Orleans, LA, September 20–24, 2004.

ADAMS, J.H. SD50

The EUSO Mission—Abstract Only. For presentation at The Second International Conference on Particle and Fundamental Physics in Space, Washington, DC, December 10–12, 2003, and for publication in Nuclear Physics B, 2004.

ADAMS, J.H. SD50

Plans for Extreme Energy Cosmic Ray Observations From Space—Abstract Only. For presentation at the Seminar at Princeton University Physics Department, Princeton, NJ, March 11, 2004.

ADAMS, J.H. SD46

Radiation Hazards and Countermeasures for Human Space Flight—Abstract Only. For presentation at the 2004 NASA/JPL Workshop on Physics for Planetary Exploration, Solvang, CA, April 19–22, 2004.

ADAMS, M. SD50
FALCONER, D.A. SD50
LEE, J.K. SD50
JONES, C. SD50

Testing Fractal Methods on Observed and Simulated Solar Magnetograms—Abstract Only. For presentation at the American Astronomical Society, Atlanta, GA, January 4–8, 2004.

ADRIAN, M.L. UAH
GALLAGHER, D.L. SD50
CRAVEN, P.D. SD50

IMAGE-POLAR Concurrent Plasmapause Observations—Abstract Only. For presentation at and publication in Proceedings of the Fall AGU Meeting, San Francisco, CA, December 13–17, 2004.

AHN, H.S. University of Maryland
SEO, E.S. University of Maryland
ADAMS, J.H. SD50
BASHINDZHAGYAN, G.L. Moscow State University
BATKOV, K.E. Moscow State University
CHANG, J. Max Planck Institute
CHRISTL, M.J. SD50
FAZELY, A.R. Southern University
GANEL, O. University of Maryland
ET AL.

The Energy Spectra of Proton and Helium Measured From the ATIC Experiment—Abstract Only. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.

ALBYN, K. ED31
EDWARDS, D.L. ED31
ALRED, J. Boeing Space Station

Changes in the Optical Properties of Simulated Shuttle Waste Water Deposits-Urine Darkening—Abstract Only.

For publication in the Journal of Spacecraft and Rockets, 2004.

ALHORN, D.C. ED17
Autonomous Assembly of Modular Structures in Space and On Extraterrestrial Locations—Abstract Only. For presentation at the Space Technology and Applications International Forum, Albuquerque, NM, February 13–17, 2005.

ALLEN, P.A. ED22
AGGARWAL, P.K. ED22
SWANSON, G.R. ED22
Development of a Fatigue Crack Growth Coupon for Highly Plastic Stress Conditions—Final Paper. For presentation at and publication in Proceedings of the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, April 19–22, 2004.

ALLEN, P.A. ED22
WILSON, C.D. Tennessee Technological University
Development of a Pressure-Dependent Constitutive Model With Combined Multilinear Kinematic and Isotropic Hardening—Final Paper. For presentation at the 2004 International ABAQUS Users Conference, Boston, MA, May 25–27, 2004.

ALTINO, K.M. UAH
KNUPP, K.R. UAH
GOODMAN, S.J. SD60
Correlation of Lightning Flash Rates With a Microburst Event—Abstract Only. For presentation at the American Meteorological Society (AMS) 22nd Conference on Severe Local Storms, Hyannis, MA, October 5–8, 2004.

ANILKUMAR, A.V. Vanderbilt University
GRUGEL, R.N. SD46
BHOWMICK, J. Vanderbilt University
WANG, T. Vanderbilt University
Experiments on Suppression of Thermocaplillary Oscillations in Sodium Nitrate Floating Half-Zones by High-Frequency End-Wall Vibrations—Abstract Only. For publication in the Journal of Crystal Growth, 2004.

ARAKERE, N.K. University of Florida
KNUDSEN, E.C. University of Florida
SWANSON, G.R. ED22
DUKE, G.C. Sverdrup Technology
HAM-BATTISTA, G. ERC, Inc.
Subsurface Stress Fields in FCC Single Crystal Anisotropic Contacts—Final Paper. For presentation at the ASME Turbo Expo, Vienna, Austria, June 14–17, 2004, and publication in the ASME Journal of Engineering for Gas Turbines and Power, 2004.

ASTAFIEVA, M.M. Paleontological Institute
ROZANOV, A.Y. Paleontological Institute
HOOVER, R.B. SD50
Framboidal Structures in Earth Rocks and in Astromaterials—Abstract Only. For presentation at the SPIE Optical Science and Technology 48th Annual Meeting, San Diego, CA, August 3–8, 2003.

ASTAFIEVA, M.M. Paleontological Institute
ROZANOV, A.Y. Paleontological Institute
HOOVER, R.B. SD50
VICKERS-RICH, P. Monash University/Clayton
WILDE, A. Monash University/Clayton
Microbial Remains in Middle Proterozoic Rocks of Northern Australia—Abstract Only. For presentation at and publication in Proceedings of the SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.

AVANOV, L.A. SD50
SMIRNOV, V.N. SD50
CHANDLER, M.O. SD50
Observations of Plasma Transient on the Lobe Field Line During the Substorm Interball Tail Observations on October 3, 1995—Abstract Only. For presentation at and publication in Proceedings of the Fall AGU 2004 Meeting, San Francisco, CA, December 13–17, 2004.

BALLARD, R. TD51
Operational Issues in the Development of a Cost-Effective Reusable LOX/LH_2 Engine—Final Paper. For presentation at the 5th International Symposium on Liquid Space Propulsion, Chattanooga, TN, October 27–30, 2003.

BAN, H. UAB
LI, C. UAB
LIN, B. UAB
EMOTO, K. UAB
SCRIPA, R.N. UAB
SU, C.-H. SD46
LEHOCZKY, S.L. SD46
Thermal Diffusivity for III–VI Semiconductor Melts at Different Temperatures—Abstract Only. For presentation at the 14th International Conference on Crystal Growth, Grenoble, France, August 10–13, 2004.

BAN, H. UAB
LIN, B. UAB
LI, C. UAB
SCRIPA, R.N. UAB
SU, C.-H. SD46
LEHOCZKY, S.L. SD46
Torque Transient of Magnetically Drive Flow for Viscosity Measurement—Abstract Only. For presentation at and publication in Proceedings of the 2004 Heat Transfer/

Fluids Engineering Summer Conference, Charlotte, NC, July 11–15, 2004.

BECKER, W. Max Planck Institute
WEISSKOPF, M.C. SD50
ARZOUMANIAN, Z. USRA
LORIMER, D. University of Manchester
CAMILO, F. Columbia University
ELSNER, R.F. SD50
KANBACH, G. Max Planck Institute
REIMER, O. Ruhr-Universiat
SWARTZ, D.A. USRA
ET AL.

A Multi-Wavelength Search for a Counterpart of the Unidentified Gamma-Ray Source 3EG J2020+4017 (2CG078+2)—Abstract Only. For publication in The Astrophysical Journal, 2004.

BECKER, W. Max Planck Institute
WEISSKOPF, M.C. SD50
TENNANT, A.F. SD50
JESSNER, A. Max Planck Institute
ZHANG, S.N. SD50/UAH

Revealing the X-Ray Emission Processes of Old Rotation-Powered Pulsars: XMM-Newton Observations of PSR B0950+08, PSR B0823+26 and PSR J2043+2740—Abstract Only. For publication in The Astrophysical Journal, 2004.

BENEFIELD, M.P.J. TD05
BELCHER, J.A. TD05

Modeling of Spacecraft Advanced Chemical Propulsion Systems—Final Paper. For presentation at the 2004 Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.

BENFORD, A. University of Texas Pan Am
TINKER, M.L. ED21

Comparison of Structural Optimization Techniques for a Nuclear Electric Space Vehicle—Final Paper. For presentation at the Space Technology and Applications International Forum, Albuquerque, NM, February 8–12, 2004.

BENFORD, A. University of Texas Pan Am
TINKER, M.L. ED20

Truss Optimization for a Manned Nuclear Electric Space Vehicle Using Genetic Algorithms—Final Paper. For presentation at the 10th AIAA/SSMO Multidisciplinary Analysis and Optimization Conference, Albany, NY, August 30–September 1, 2004.

BERNHARDSDOTTER, E.C.M.J. SD46
PUSEY, M.L. SD46
NG, J.D. SD46
GARRIOTT, O.K. SD46

Cloning and Characterization of an α-amylase Gene From the Hyperthermophilic Archaeon Thermococcus Thioreducens—Abstract Only. For publication in the Journal of Biological Chemistry, 2004, and in Process Biochemistry, 2004.

BERNHARDSDOTTER, E.C.M.J. SD46
PUSEY, M.L. SD46
NG, J.D. UAH
GARRIOTT, O.K. SD46

Enzymatic Properties of an Alkaline and Chelator Resistant α-Amylase From the Alkaliphilic Bacillus Sp. Isolate L1711—Abstract Only. For publication in the Journal of Fermentation Engineering, 2004, and in Process Biochemistry, 2004.

BERNHARDSDOTTER, E.C.M.J. UAH
PUSEY, M.L. SD46
NG, J.D. UAH
GARRIOTT, O.K. UAH

Alpha-Amylase From the Hyperthermophilic Archaeon Thermococcus Thireducens—Abstract Only. For presentation at the American Society for Gravitational and Space Biology, Huntsville, AL, November 12–16, 2003.

BHARDWAJ, A. Vikram Sarabhari Space Center
BRANDUARDI-RAYMONT, G. U. College London
ELSNER, R.F. SD50
GLADSTONE, G.R. Southwest Research Institute
RAMSAY, G. Mullard Space Science Laboratory
RODRIGUEZ, P.R. XMM-Newton SOC
SORIA, R. University College London
WAITE, JR., J.H. University of Michigan
CRAVENS, T.E. University of Kansas

Solar Control on Jupiter's Equatorial X-Ray Emissions: 26–29 November 2003 XMM-Newton Observation—Abstract Only. For publication in Geophysical Research Letters, 2004.

BHARDWAJ, A. SD50
ELSNER, R.F. SD50
GLADSTONE, G.R. Southwest Research Institute
WAITE, JR., J.H. University of Michigan
CRAVENS, T.E. University of Kansas
OSTGAARD, N. University of Bergen
CHANG, S.-W. UAH/SD50
METZGER, A.E. Jet Propulsion Laboratory
MAJEED, T. University of Michigan

First Terrestrial Soft X-Ray Aurora Observations by Chandra—Abstract Only. For presentation at and publication in Proceedings of the Huntsville Modeling Workshop, Huntsville, AL, October 18–22, 2004.

BLACKWELL, W.C. Jacobs Sverdrup
MINOW, J.I. Jacobs Sverdrup
O'DELL, S.L. ED44
CAMERON, R.A. Harvard-Smithsonian
VIRANI, S.N. Harvard-Smithsonian
The Chandra X-Ray Observatory Radiation Environment Model—Update—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

BLAKESLEE, R.J. SD60
BAILEY, J.C. SD60
BUECHLER, D.E. SD60
GOODMAN, S.J. SD60
MCCAUL, JR., E.W. SD60
HALL, J. SD60
The North Alabama Lightning Mapping Array (LMA): A Network Overview—Abstract Only. For presentation at and publication in Proceedings of the American Meteorological Society (AMS) 85th Annual Meeting, San Diego, CA, January 9–13, 2005.

BLEVINS, J.A. TD40
GOSTOWSKI, R. TD40
CHIANESE, S. Penn State University
An Experimental Investigation of Hypergolic Ignition Delay of Hydrogen Peroxide With Fuel Mixtures—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

BLUME, J.L. ED43
Applying a Crew Accommodations Resource Model to Future Space Vehicle Research—Presentation. For presentation at the Huntsville Simulation Conference 2003, Huntsville, AL, October 29–31, 2003.

BOCCIPPIO, D.J. SD60
Multivariate Statistical Inference of Lightning Occurrence, and Using Lightning Observations—Abstract Only. For presentation at the International Lightning Detection Conference, Helsinki, Finland, June 7–9, 2004.

BOCCIPPIO, D.J. SD60
An Orbital "Virtual Radar" From TRMM Passive Microwave and Lightning Observations—Abstract Only. For presentation at and publication in Proceedings of the American Geophysical Union Fall Meeting 2004, San Francisco, CA, December 13–17, 2004.

BOCCIPPIO, D.J. SD60
CECIL, D.J. SD60
PETERSEN, W.A. SD60
Lightning Contribution to Improvement of Passive Microwave Vertical Structure and Rainfall Estimation—Abstract Only. For presentation at and publication in Proceedings of the American Meteorological Society (AMS) 85th Annual Meeting, San Diego, CA, January 9–13, 2005.

BOCCIPPIO, D.J. SD60
PETERSON, W.A. UAH
CECIL, D.J. UAH
The Tropical Convective Spectrum: 1. Archetypal Vertical Structures—Abstract Only. For publication in the Journal of Climate, 2004.

BOEDER, P. Boeing
MIKATARIAN, R. Boeing
KOONTZ, S. Johnson Space Center
ALBYN, K. ED31
FINCKENOR, M. ED31
Simulated Space Environment Effects on the Blocking Force of Silicone Adhesive—Abstract Only. For presentation at the 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 10–13, 2005.

BONAMENTE, M. UAH/SD50
JOY, M.K. SD50
CARLSTROM, J.E. Enrico Fermi Institute
LAROQUE, S. University of Chicago
Determination of Cluster Distances From Chandra Imaging Spectroscopy and Sunyaev-Zeldovich Effect Measurements: I—Analysis Methods and Initial Results—Abstract Only. For publication in The Astrophysical Journal, 2004.

BONAMENTE, M. SD50
LIEU, R. SD50
KAASTRA, J. SD50
The Soft Excess Emission in the Hercules Supercluster Observed With the ROSAT Position Sensitive Proportional Counter—Abstract Only. For publication in The Astrophysical Journal, 2004.

BRADFORD, R.N. FD40
New Directions in Space Operations Services in Support of Interplanetary Exploration—Abstract Only. For presentation at the IEEE Aerospace Conference, Big Sky, MT, March 5–12, 2005.

BRADFORD, R.N. FD40
LISOTTA, A.J. Ames Research Center
Spaceflight Operations Services Grid Project—Presentation. For presentation at the SpaceOps 2004, Montreal, Quebec, Canada, May 17–21, 2004.

BRADFORD, R.N. FD40
MEHROTRA, A. Ames Research Center
LISOTTA, A.J. Ames Research Center
Spaceflight Operations Services Grid Prototype—Final Paper. For presentation at the SpaceOps 2004, Montreal, Quebec, Canada, May 17–21, 2004.

BRADFORD, R.N. FD40
THIGPEN, W.W. Ames Research Center
Spaceflight Operations Services Grid (SOSG)—Abstract Only. For presentation at the 2004 Ground Systems Architecture Workshop, Manhattan Beach, CA, March 30–April 1, 2004.

BRADFORD, R.N. FD40
THIGPEN, W.W. Ames Research Center
LISOTTA, A.J. Ames Research Center
REDMAN, S. UAH
Spaceflight Operations Services Grid (SOSG) Prototype Implementation and Feasibility Study—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.

BRAGG-SITTON, S.M. TD40
FORSBACKA, M. NASA Headquarters
Application of a Virtual Reactivity Feedback Control Loop in Non-Nuclear Testing of a Fast Spectrum Reactor—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants (ICAPP 2004), Pittsburg, PA, June 13–17, 2004.

BRAGG-SITTON, S.M. University of Michigan
KAPERNICK, R.J. Los Alamos National Laboratory
GODFROY, T.J. TD40
Single Channel Testing for Characterization of the Direct Gas Cooled Reactor and the Safe-100 Heat Exchanger—Final Paper. For presentation at the 2004 Space Technology and Applications International Forum, Albuquerque, NM, February 8–12, 2004.

BRAGG-SITTON, S.M. TD40
REID, R.S. TD40
Transient Approximation of SAFE-100 Heat Pipe Operation—Final Paper. For presentation at the 2005 Space Technology and Applications International Forum, Albuquerque, NM, February 13–17, 2005.

BRANDUARDI-RAYMONT, G. Mullard Space Sci. Lab
ELSNER, R.F. SD50
GLADSTONE, G.R. Southwest Research Institute
RAMSAY, G. Mullard Space Science Laboratory
RODRIGUEZ, P.R. XMM-Newton SOC
SORIA, R. Mullard Space Science Laboratory
WAITE, JR., J.H. University of Michigan
First Observation of Jupiter by XMM-Newton—Abstract Only. For publication in The Astronomy Journal, 2004, and in The Astrophysics Journal, 2004.

BRISCOE, J.M. ED12
BRODERICK, D.J. Auburn University
HOWARD, R.T. ED19
CORDER, E.L. ED12
Machine Vision Applied to Navigation of Confined Spaces—Final Paper. For presentation at the SPIE Defense and Security Symposium, Orlando, FL, April 12–16, 2004.

BROWN, A.M. ED21
MCGHEE, D.S. ED21
Statistical Comparison and Improvement of Methods for Combining Random and Harmonic Loads—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Palm Springs, CA, April 19–22, 2004.

BRUBAKER, N. SD60
JEDLOVEC, G.J. SD60
A Cloud Mask for AIRS—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.

BUECHLER, D.E. UAH
CHRISTIAN, H.J. SD60
GOODMAN, S.J. SD60
The GOES-R Lightning Mapper Sensor—Abstract Only. For presentation at and publication in Proceedings of the National Weather Association Annual Meeting, Portland, OR, October 16–21, 2004.

BUECHLER, D.E. UAH
GOODMAN, S.J. SD60
LA CASSE, K. SD60
BLAKESLEE, R.J. SD60
DARDEN, C. SD60
Assessments of Total Lightning Data Utility in Weather Forecasting—Abstract Only. For presentation at and publication in Proceedings of the American Meteorological Society Conference on Meteorological Applications of Lightning Data, San Diego, CA, January 9–13, 2005.

BUECHLER, D.E. UAH
MCCAUL, JR., E.W. USRA
GOODMAN, S.J. SD60
BLAKESLEE, R.J. SD60
BAILEY, J.C. Raytheon ITSS
GATLIN, P.N. UAH
The Severe Weather Outbreak of 10 November 2002: Lightning and Radar Analysis of Storms in the Deep South—Abstract Only. For presentation at and publication in Proceedings of the American Meteorological Society 22nd Conference on Severe Local Storms, Hyannis, MA, October 5–8, 2004.

BURNS, H. ED31
ALBYN, K. ED31

EDWARDS, D.L. ED31
BOOTHE, R. ED31
FINCHUM, C. ED31
FINCKENOR, M. ED31
Capabilities of the Materials Contamination Team at Marshall Space Flight Center—Abstract Only. For presentation at the Contamination of Optical Equipment Workshop, Noordwijk, The Netherlands, December 11–12, 2003.

BURNS, L. Raytheon
DECKER, R. ED44
A Climatological Study of Cloud-to-Ground Lightning Strikes in the Vicinity of the Kennedy Space Center—Abstract/Final Paper. For presentation at the 11th AMS Conference on Aviation, Range and Aerospace Meteorology, Hyannis, MA, October 4-8, 2004.

BURNS, L. Raytheon
KELLER, V.W. ED44
Proposed Plan for Adopting Updated Range Reference Atmospheres—Presentation. For presentation at the 2004 Department of Defense Climatology Workshop, Asheville, NC, April 28–30, 2004.

CAMPBELL, J.W. FD02
PHIPPS, C. Photonics Associates
SMALLEY, L. UAH
REILLY, J. Northeast Science & Technology
BOCCIO, D. SUNY
The Impact Imperative: A Space Infrastructure Enabling a Multi-Tiered Earth Defense—Final Paper. For presentation at the 2004 Planetary Defense Conference: Protecting Earth From Asteroids, Garden Grove, CA, February 23–26, 2004.

CANFIELD, S. Tennessee Technological University
BEARD III, J.W. Tennessee Technological University
PEDDIESON, J. Tennessee Technological University
EWING, A. Ewing Research
GARBE, G. TD05
Similarity Rules for Scaling Solar Sail Systems—Final Paper. For presentation at the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–30, 2004.

CANNING, F.X. ISR
WINET, E. ISR
ICE, B. ISR
MELCHER, C. ISR
PESAVENTO, P. ISR
HOLMES, A. ISR
BUTLER, C. ISR
COLE, J. TD40
CAMPBELL, J. TD40
Asymmetrical Capacitors for Propulsion—Presentation. For presentation at the IEEE Upper Monongalia Subsection of Pittsburg Section of IEEE, Morgan Town, WV, February 23, 2004.

CANNING, F.X. ISR
WINET, E. ISR
ICE, B. ISR
MELCHER, C. ISR
PESAVENTO, P. ISR
HOLMES, A. ISR
BUTLER, C. ISR
COLE, J. TD40
CAMPBELL, J. TD40
The ISR Asymmetrical Capacitor Thruster; Experimental Results and Improved Designs—Presentation. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.

CANNING, F.X. ISR
WINET, E. ISR
COLE, J. TD40
CAMPBELL, J. TD40
The ISR Asymmetrical Capacitor Thruster: Experimental Results and Improved Designs—Abstract/Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.

CARDELINO, H. Spellman College
CARDELINO, C.A. Georgia Institute of Technology
MOORE, C.E. SD46
DIETZ, N. Georgia State University
MCCALL, S.D. Spellman College
BACHMANN, K. North Carolina State University
Advanced Computational Modeling of Vapor Deposition in a High-Pressure Reactor—Abstract Only. For publication in Proceedings of the 2004 Conference on Advances in Internet Technologies and Applications, West Lafayette, IN, July 8–11, 2004.

CARPENTER, P.K. SD46
ARMSTRONG, J. SD46
Accuracy Evaluation of Electron-Probe Microanalysis as Applied to Semiconductors and Silicates—Abstract Only. For presentation at the 2004 Australian Conference on Microscopy and Microanalysis 19, Geelong, Australia, February 1–6, 2004.

CARPENTER, P.K. SD46
ARMSTRONG, J. NIST
Improvements in Electron-Probe Microanalysis: Applications to Terrestrial, Extraterrestrial, and Space-Grown

Materials—Abstract Only. For presentation at the Microscopy and Microanalysis 2004 Conference, Savannah, GA, August 1–5, 2004.

CARRASQUILLO, R.L. FD21
BAGDIGIAN, B. FD21
PERRY, J.L. FD21
LEWIS, J.
Evolution of the Baseline *ISS* ECLSS Technologies—The Next Logical Steps—Abstract Only. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

CARRASQUILLO, R.L. FD21
CLOUD, D. Hamilton Sundstrand
BEDARD, J. Hamilton Sundstrand
Status of the Node 3 Regenerative ECLSS Water Recovery and Oxygen Generation Systems—Abstract Only. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

CARRIER, M. Florida State University
ZOU, X. Florida State University
LAPENTA, W.M. SD60
JEDLOVEC, G.J. SD60
Assessing the Usefulness of AIRS Radiance Observations in a 4D-Var Assimilation Scheme Using the Penn State/NCAR Mesoscale Model Version 5 (MM5) and a Stand Alone Radiative Transfer Algorithm (SARTA)—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.

CARRINGTON, C.K. FD02
DAY, G. Boeing Phantom Works
A High-Energy Technology Demonstration Platform: The First Step in a Stepping Stones Approach to Energy-Rich Space Infrastructures—Abstract/Final Paper. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.

CARRINGTON, C.K. FD02
HOWELL, J.T. FD02
DAY, G. Boeing Phantom Works
A 100 kW-Class Technology Demonstrator for Space Solar Power—Abstract Only. For presentation at the Fourth International Conference on Solar Power From Space, Granada, Spain, June 30–July 2, 2004.

CARTER, L. FD21
TATARA, J.D. FD21
MASON, R. FD21
O'CONNOR, E. FD21
BEDARD, J. FD21
Performance Assessment of the *ISS* Water Processor Assembly Reactor—Abstract Only. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

CASIANO, M.J. TD63
ZOLADZ, T.F. TD63
Acoustic Modeling and Analysis for the Space Shuttle Main Propulsion System Liner Crack Investigation—Abstract Only. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.

CATALINA, A.V. BAE/SD46
STEFANESCU, D.M. University of Alabama
SEN, S. SD46
Analytical Solution for the Critical Velocity of Pushing/Engulfment Transition—Abstract Only. For presentation at the TMS Annual Meeting, Charlotte, NC, March 14–18, 2004.

CECIL, D.J. UAH
LAFONTAINE, F.J. Raytheon ITSS
HOOD, R.E. SD60
BLAKESLEE, R.J. SD60
MACH, D.M. UAH
HEYSFIELD, G. Goddard Space Flight Center
Classification of Tropical Oceanic Precipitation Using High Altitude Aircraft Microwave and Electric Field Measurements—Abstract Only. For presentation at and publication in Proceedings of Eos 2004 Joint Assembly: AGU, Canadian Geophysical Union, and Society of Exploration Geophysicists, Montreal, CA, May 17–24, 2004; and for publication in Proceedings of the 26th AMS Conference on Hurricanes & Tropical Meteorology, Miami, FL, May 3–7, 2004.

CHANG, H. UAH
SMITH, D.D. SD46
Gain-Assisted Superluminal Propagation in Coupled Optical Resonators—Abstract Only. For presentation at the Optical Society of American Frontiers in Optical Conference (OSA), Rochester, NY, October 10–14, 2004.

CHANG, J. Purple Mountain Observatory
SCHMIDT, W.K.H. Max Planck Institute
ADAMS, J.H. SD50
AHN, H.S. University of Maryland
BASHINDZHAGYAN, G.L. Moscow State University
BATKOV, K.E. Moscow State University
CHRISTL, M.J. SD50

FAZELY, A.R. Southern University
GANEL, O. University of Maryland
ET AL.
The Electron Spectrum Above 20 GeV Measured by ATIC—Abstract Only. For presentation at and publication in Proceedings of the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.

CHANG, S.-W. SD50
GALLAGHER, D.L. SD50
SPANN, J.F. SD50
MENDE, S. SD50
GREENWALD, R. SD50
NEWELL, P.T. SD50
Cusp and LLBL as Sources of the Isolated Dayside Auroral Feature During Northward IMF—Abstract Only. For publication in the Journal of Geophysical Research, 2004.

CHAVERS, G. TD40
CHANG-DIAZ, F. Johnson Space Center
Development and Demonstration of a Device to Determine Thrust by Measuring the Force on a Target Plate in the Exhaust of a Plasma Thruster—Abstract Only. For presentation at the 40th Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.

CHAVERS, G. TD40
CHANG-DIAZ, F. Johnson Space Center
BREIZMAN, B. University of Texas
BENGTSON, R. University of Texas
Momentum Flux Measurements Using an Impact Thrust Stand—Abstract Only. For presentation at the American Physical Society 46th Annual Meeting of the Division of Plasma Physics, Savannah, GA, November 15–19, 2004.

CHEN, F. SD60
KISSEL, D.E. SD60
WEST, L.T. SD60
RICKMAN, D. SD60
LUVALL, J.C. SD60
ADKINS, W. SD60
Mapping Surface Soil Organic Carbon for Crop Fields With Remote Sensing—Abstract Only. For publication in the Journal of Soil and Water Conservation, 2004.

CHERNOV, A.A. SD46
RASHKOVICH, L.N. SD46
VEKILOV, P.G. SD46
Steps in Solution Growth: Dynamics of Kinks, Bunching and Turbulence—Abstract Only. For publication in the Journal of Crystal Growth, 2004.

CHERNOV, A.A. SD46
RASHKOVICH, L.N. SD46
VEKILOV, P.G. SD46
DE YOREO, J.J. SD46
Step and Kink Dynamics in Organic and Protein Crystallization—Abstract Only. For publication in the Materials Research Bulletin, 2004.

CHOU, S.-H. SD60
LAPENTA, W.M. SD60
JEDLOVEC, G.J. SD60
MCCARTY, W. UAH
MECIKALSKI, J.R. UAH
Regional Assimilation of NASA Atmospheric Infrared Sounder (AIRS) Data—Abstract Only. For presentation at and publication in Proceedings of the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–23, 2004.

CHOUDHARY, D.P. SD50
Large Solar Observatory—Abstract Only. For publication in Current Science, 2003.

CHOUDHARY, D.P. SD50
BALASUBRAMANIAM, K.S. National Solar Observatory
SUEMATSU, Y. National Astronomical Observatory
Asymmetric Stokes-V Profiles at the Penumbral Boundary of a Sunspot—Abstract Only. For presentation at and publication in Proceedings of the Fifth Solar-B Science Meeting, Tokyo, Japan, November 12–14, 2003.

CHOUDHARY, D.P. SD50
MOORE, R.L. SD50
Quiet-Region Filament Eruptions—Abstract Only. For presentation at the 204th Meeting of the American Astronomical Society, Denver, CO, May 30–June 3, 2004.

CHOUDHARY, D.P. SD50
MOORE, R.L. SD50
FALCONER, D.A. SD50
POJOGA, S. Prairie View A&M University
HUANG, T.S. Prairie View A&M University
KRUCKER, S. University of California
UDDIN, W. Aryabhatta Research Institute
Triggering of the Two X-class Flares of 28 and 29 October 2003—Abstract Only. For presentation at the 204th Meeting of the American Astronomical Society, Denver, CO, May 30–June 3, 2004.

CHOUDHARY, D.P. SD50
STERLING, A.C. SD50
MOORE, R.L. SD50
YURCHYSHYN, V. Big Bear Solar Observatory
Evidence of "Tether-Cutting" Reconnection in the Onset of Quadrupolar Solar Magnetic Eruption—Abstract Only. For presentation at the 204th Meeting of the American Astronomical Society, Denver, CO, May 30–June 3, 2004.

CHRISTIAN, H.J. SD60
Total Lightning Activity as Observed From Space—Abstract Only. For presentation at the Darwin Lightning Observatory Workshop, Osaka, Japan, March 7–10, 2004, and at the Meeting With the National Space Projects Office on Lightning Mapper, Taipei, Taiwan, March 4–5, 2004.

CHRISTIAN, H.J. SD60
Global Lightning Activity—Abstract Only. For presentation at the University of Mexico, Mexico City, Mexico, March 14–20, 2004, and at the India-United States Conference on Space Science, Applications, and Commerce, Bangalore, India, June 21–25, 2004.

CHRISTL, M.J. SD50
Performance of the Zero Degree Detector—Abstract Only. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.

CISSOM, R.D. FD32
WATSON, K. ARES Corporation
Real-Time Payload Operations on the *International Space Station*—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.

CISZAK, E.M. SD46
DOMINIAK, P.M. SD46
The Thiamine Pyrophosphate-Motif—Abstract Only. For presentation at the Keystone Symposium, Snowbird, Utah, April 13–15, 2004.

CLAYTON, L. ED25
Thermostructural Analysis of Carbon Cloth Phenolics "Ply Lifting" and Correlation to LHMEL Test Results—Abstract Only. For presentation at the JANNAF 14th Nondestructive Evaluation 23rd Rocket Nozzle Technology and 36th Structures & Mechanical Behavior Subcommittee Meeting, New Orleans, LA, March 30–April 1, 2004.

CLINTON, JR., R.G. SD40
Strategic Research Directions in Microgravity Materials Science—Presentation. For presentation at the Transformational Space Launch and Operations Technologies Conference, Washington, DC, May 24–26, 2004.

CLINTON, JR., R.G. SD40
SEMMES, E.B. SD41
COOK, M.B. SD30
WARGO, M.J. NASA Headquarters
MARZWELL, N.I. Jet Propulsion Laboratory
Strategic Research Directions in Microgravity Materials Science—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

CLINTON, JR., R.G. SD40
SEMMES, E.B. SD40
SCHLAGHECK, R.A. SD40
BASSLER, J.A. SD40
COOK, M.B. SD40
WARGO, M. J. NASA Headquarters
SANDERS, G.B. Johnson Space Center
MARZWELL, N.I. Jet Propulsion Laboratory
Low Gravity Materials Science Research for Space Exploration—Abstract Only. For presentation at the 4th International Conference on Solidification and Gravity, Miskolc, Hungary, September 6–9, 2004.

COFFEY, V.N. SD50
CHANDLER, M.O. SD50
SINGH, N. UAH
MILLER, J. UAH
MOORE, T.E. Goddard Space Flight Center
Observed Relationship Between Ion Energization and the Broadband ELF Spectrum—Abstract Only. For presentation at and publication in Proceedings of the American Geophysical Union 2004 Fall Annual Meeting, San Francisco, CA, December 13–17, 2004.

COOK, S.A. NP01
MORRIS, C.E.K. NP01
TYSON, R.W. NP01
Technology Innovations From NASA's Next Generation Launch Technology Program—Final Paper. For presentation at the 5th International Astronautical Congress, Vancouver, CA, October 4–8, 2004.

COOKE, W.J. Morgan Research Corporation
MOSER, D. Morgan Research Corporation
SUGGS, R.M. ED44
Meteor Outbursts and Storms From the Spacecraft Hazard Perspective—Abstract Only. For presentation at the Meteoroids 2004, London, Ontario, August 16–20, 2004.

CORDER, E.L. ED12
BRISCOE, J.M. ED12
Imaging System for Measuring Macromolecule Crystal Growth Rates in Microgravity—Abstract Only. For presentation at the Microscopy and Microanalysis 2004, Savannah, GA, August 1–5, 2004.

CRAVEN, P.D. SD50
MOORE, T.E. SD50
GALLAGHER, D.L. SD50
Thermal N+ in the Inner Magnetosphere—Abstract Only. For presentation at the American Geophysical Union 2004

Fall Annual Meeting, San Francisco, CA, December 13–17, 2004.

CRUZ, A. SD46
BORS, K. SD46
JANSEN, H. SD46
RICHMOND, R.C. SD46
Radiation Dose Effects on Cell Cycle, Apoptosis, and Marker Expression of Ataxia Telangiectasia-Heterozygous Human Breast Epithelial Cells—Abstract Only. For presentation at the 5th Annual Biological Sciences Retreat, Guntersville, AL, October 11, 2003.

CRUZEN, C. FD32
DYER, S. FD33
Expanding Remote Science Operations Capabilities Onboard the *International Space Station*—Abstract/Final Paper. For presentation at the 2005 IEEE Aerospace Conference, Big Sky, MT, March 5–12, 2005.

CUNTZ, M. University at Texas/Arlington
SUESS, S.T. SD50
Shock Formation and Energy Dissipation of Slow Magnetosonic Waves in Coronal Plumes—Abstract Only. For publication in Proceedings of the 12th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun, Boulder, CO, July 30–August 3, 2001.

CUNTZ, M. SD50
SUESS, S.T. SD50
Properties of Longitudinal Flux Tube Waves III. Wave Propagation in Solar and Stellar Wind Flows—Abstract Only. For publication in Astronomy & Astrophysics, 2004.

CURRERI, P.A. SD46
SIBILLE, L. BAE Systems
Microgravity Materials Research—Abstract Only. For presentation at the Space Technology and Applications International Forum (STAIF), Albuquerque, NM, February 8–11, 2004.

DARROUZET, F. Belgian Institute
LEMAIRE, J.F. Belgian Institute
DECREAU, E. Universite d' Oreleans
DE KEYSER, J. Belgian Institute
MASSON, A. Research and Scientific
GALLAGHER, D.L. SD50
SANTOLIK, O. MMF, Prague
TROTIGNON, J.G. Universite d' Orleans
RAUCH, J.L. Universite d' Orleans
ET AL.
Density Irregularities Inside the Plasmasphere: Cluster Observations—Abstract Only. For publication in Annales Geophysicae, 2003.

DAVIS, R.N. University of Alabama
POLITES, M.E. University of Maryland
TREVINO, L.C. ED10
Autonomous Component Health Management With Failed Component Detection, Identification, and Avoidance—Abstract Only. For publication in the Journal of Aerospace Engineering and Proceedings of the Institution of Mechanical Engineers, Part G, 2004.

DAVIS, S.E. ED36
ENGEL, C.D. ED36
RICHARDSON, E.R. ED36
Upward Flammability Testing—A Probabilistic Measurement—Abstract Only. For presentation at the Tenth International Symposium on Flammability and Sensitivity of Materials in Oxygen-Enriched Atmospheres, Brisbane, Queensland, Australia, November 10–14, 2003.

DECKER, R.K. ED44
LEACH, R. ED44
Tropospheric Wind Monitoring During Day-of-Launch Operations for National Aeronautics and Space Administration's Space Shuttle Program—Final Paper. For presentation at the 11th AMS Conference on Aviation, Range, and Aerospace Meteorology, Hyannis, MA, October 4–8, 2004.

DECKER, R.K. ED44
LEACH, R. Morgan Research Corporation/ED44
Assessment of Atmospheric Winds Aloft During NASA Space Shuttle Program Day-of-Launch Operations—Abstract Only. For presentation at the 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 10–13, 2005.

DETKOVA, E.N. Institute of Microbiology
PIKUTA, E.V. SD50
HOOVER, R.B. SD50
Halotolerant and Resistant to High pH Hydrogenase From Haloalkaliphillic Sulfate-Reducing Bacterium Desulfonatronum Thiodismutans—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.

DOBSON, C. TD40
HRBUD, I. Purdue University
Electron Density and Two-Channel Neutron Emission Measurements in Steady-State Spherical Inertial-Electrostatically Confined Plasmas, With Review of the 1-D Kinetic Model—Final Paper. For publication in the Journal of Applied Physics, 2004.

DOMINIAK, P.M. SD46
CISZAK, E.M. SD46

The Thiamin Pyrophosphate-Motif—Abstract Only. For publication in Nature Structural Biology, 2003, and in the Journal of Molecular Biology, 2003.

DOMINIAK, P.M. SD46
CISZAK, E.M. SD46
The Conservation of Structure and Mechanism of Catalytic Action in a Family of Thiamin Pyrophosphate (TPP)-Dependent Enzymes—Abstract Only. For publication in Proteins: Structure, Function, and Bioinformatics, 2004.

DORNEY, D.J. TD64
MARCU, B. Boeing/Rocketdyne
Numerical Simulations of Vortex Shedding in Hydraulic Turbines—Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.

DUMBACHER, D.L. XP01
X-37 Flight Demonstrator Project: Capabilities for Future Space Transportation System Development—Final Paper and Presentation. For presentation at the International Astronautical Federation, Vancouver, British Columbia, Canada, October 7, 2004.

EDWARDS, D.L. ED31
HOLLERMAN, W. University of Louisiana
HUBBS, W.S. ED31
GRAY, P.A. CRC/ED31
WERTZ, G.E. ED31
HOPPE, D.T. ED31
NEHLS, M.K. ED31
SEMMEL, C.L. Qualis Corporation/ED31
Electron Radiation Effects on Candidate Solar Sail Material—Final Paper. For publication in High Performance Polyers, 2003.

EDWARDS, D.L. ED31
HOVATER, M. ED31
HUBBS, W.S. ED31
WERTZ, G.E. ED31
HOLLERMAN, W. University of Louisiana
GRAY, P.A. Qualis Corporation
Characterization of Candidate Solar Sail Material Exposed to Space Environmental Effects—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

EDWARDS, D.L. ED31
NEHLS, M.K. ED31
SEMMEL, C.L. Qualis Corporation/ED31
HOVATER, M. ED31
GRAY, P.A. ICRC/ED31
HUBBS, W.S. ED31
WERTZ, G.E. ED31
Space Environmental Effects on Candidate Solar Sail Materials—Abstract Only. For presentation at the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–29, 2004.

EDWARDS, D.L. ED31
SEMMEL, C.L. Qualis Corporation
HOVATER, M. ED31
NEHLS, M.K. ED31
GRAY, P.A. ICRC/ED31
HUBBS, W.S. ED31
WERTZ, G.E. ED31
Status of Solar Sail Material Characterization at NASA's Marshall Space Flight Center—Abstract Only. For presentation at The Seventh International Space Conference Protection of Materials and Structures From the Space Environment, Toronto, Ontario, Canada, May 10–13, 2004.

EDWARDS, D.L. ED31
SEMMEL, C.L. Qualis Corporation
HOVATER, M. ED31
NEHLS, M.K. ED31
GRAY, P.A. ICRC/ED31
HUBBS, W.S. ED31
WERTZ, G.E. ED31
Solar Sail Material Performance Property Response to Space Environmental Effects—Abstract Only. For presentation at the Seventh International Space Conference Protection of Materials and Structures From the Space Environment, Toronto, Ontario, Canada, May 10–13, 2004, and the International Symposium on Optical Science and Technology, Denver, CO, August 2–6, 2004.

ELANDER, V. UNLV
KOSHAK, W. SD60
PHANORD, D. UNLV
A Preliminary ZEUS Lightning Location Error Analysis Using a Modified Retrieval Theory—Abstract Only. For presentation at and publication in Proceedings of the 2004 Fall Meeting of the American Geophysical Union, San Francisco, CA, December 13–17, 2004.

ELSNER, R.F. SD50
BHARDWAJ, A. NRC
WAITE, JR., J.H. University of Michigan
LUGAZ, N. University of Michigan
MAJEED, T.E. University of Michigan
CRAVENS, T. University of Kansas
GLADSTONE, G.R. Southwest Research Institute
FORD, P. MIT
GRODENT, D. Universite de Liege
ET AL.

Simultaneous Chandra X-Ray, HST UV, and Ulysses Radio Observations of Jupiter's Aurora—Abstract Only. For presentation at the 2004 Meeting of the High Energy Astrophysics Division of the American Astronomical Society, New Orleans, LA, September 8–11, 2004.

ELSNER, R.F. SD50
RAMSEY, B.D. SD50
WAITE, JR., J.H. University of Michigan
REHAK, P. BNL
JOHNSON, R.E. University of Virginia
COOPER, J.F. Raytheon
SWARTZ, D.A. USRA
X-MIME: An Imaging X-Ray Spectrometer for Detailed Study of Jupiter's Icy Moons and the Planet's X-Ray Aurora—Abstract Only. For presentation at the 36th Annual DPS Meeting, Louisville, KY, November 8–12, 2004.

ELSNER, R.F. SD50
RAMSEY, B.D. SD50
WAITE, JR., J.H. University of Michigan
REHAK, P. Brookhaven National Laboratory
JOHNSON, R.E. University of Virginia
COOPER, J.F. Raytheon
SWARTZ, D.A. USRA/SD50
X-Ray Probes of Magnetospheric Interactions With Jupiter's Auroral Zones, the Galilean Satellites, and the Io Plasma Torus—Abstract Only. For publication in Icarus, 2004.

EMERSON, C.W. Western Michigan University
LAM, S.-N. Louisiana State University
QUATTROCHI, D.A. SD60
A Comparison of Local Variance Fractal Dimension, and Moran's I as Aids to Multispectral Image Classification—Abstract Only. For publication in the International Journal of Remote Sensing, 2004.

EMRICH, W.J. TD40
HAWK, C.W. UAH
Magnetohydrodynamic Instabilities in a Simple Gasdynamic Mirror Propulsion System—Final Paper. For publication in the Journal of Propulsion and Power, 2004.

ENG, R. SD72
STAHL, P. SD72
HOGUE, W. SD72
HADAWAY, J. UAH
Poco Graphite Inc. SuperSiC 0.25m Mirror Cryogenic Test Result—Abstract Only. For presentation at the Mirror Technology Days, Huntsville, AL, August 17–19, 2004.

ENGBERG, R.C. ED27
OOI, T.K. UAH
Methods and Piezoelectric Imbedded Sensors for Damage Detection in Composite Plates Under Ambient and Cryogenic Conditions—Final Paper. For presentation at the Society of Photo-Optical Instrumentation Engineers, San Diego, CA, March 14–16, 2004.

ENGELHAUPT, D. UAH
RAMSEY, B.D. SD50
Electrodeposition of High Quality Nickel Phosphorous Alloys for Pollution Reduction and Energy Conservation—Abstract Only. For presentation at and publication in Proceedings of the American Electroplaters & Surface Finishers Society Week 2004, Lake Buena Vista, FL, January 26–30, 2004, and for presentation at the American Electroplaters and Surface Finishers Society's Aerospace/Airline Plating & Metal Finishing Forum, Tulsa, OK, March 29–April 1, 2004.

ESTES, H. ED17
A NASA SHARP Mentoring Experience Utilizing GP-B—Presentation. For presentation at the American Association of Physics Teachers 128th National Meeting, Miami Beach, FL, January 24–28, 2004.

EVANS, S.W. ED44
Tethers as Debris: Simulating Impacts of Kevlar Tethers on Shuttle Tiles—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, April 19–24, 2004.

EVANS, S.W. ED44
STALLWORTH, R. ED23
STELLINGWERF, R.F. Stellingwerf Consulting
Comparison of SPHC Hydrocode Results With Penetration Equations and Results of Other Codes—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, April 19–24, 2004.

FALCONER, D.A. SD50
MOORE, R.L. SD50
GARY, G.A. SD50
Prediction of Active-Region CME Productivity From Magnetograms—Abstract Only. For publication in The Astrophysical Journal, 2004.

FALCONER, D.A. UAH/SD50
MOORE, R.L. SD50
GARY, G.A. SD50
BALASUBRAMANIAN, S. UAH/SD50
Forecasting Coronal Mass Ejections From Magnetograms—Abstract Only. For presentation at the Living With a Star Workshop, Boulder, CO, March 23–26, 2004;

for presentation at and publication in Proceedings of the American Astronomical Society, Solar Physics Division, Denver, CO, May 31–June 3, 2004; and for presentation at the Solar, Heliospheric and Interplanetary Environment 2004 Workshop, Big Sky, MT, June 27–July 2, 2004.

FARR, R.A. TD72
ELAM, S.K. TD61
HICKS, E.D. Jacobs Sverdrup
SANDERS, T.M. TD72
LONDON III, J.R. TD70
MAYNE, A.W. TRW (Retired)
CHRISTENSEN, D.L. Lockheed Martin

The 2003 Goddard Rocket Replica Project: A Reconstruction of the World's First Functional Liquid Rocket System—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

FERGUSON, C.K. SD22
ABUSHAGUR, M. SD22
ENGLISH, J.M. SD22
NORDIN, G.P. SD22

Design and Analysis of a MEMS Miro-Translation Stage With Indefinite Travel—Abstract Only. For presentation at the Nanospace 2003, Galveston, TX, February 2004.

FISHMAN, G.J. SD50

The Mystery of Gamma-Ray Bursts—Abstract Only. For presentation at the Rice University Space Exploration Series, Houston, TX, March 22, 2004.

FLANDRO, G.A. University of Tennessee
MAJDALANI, J. University of Tennessee
SIMS, J.D. TD07

Nonlinear Longitudinal Mode Instability in Liquid Propellant Rocket Engine Preburners—Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004.

FLASAR, F.M. Goddard Space Flight Center
KUNDE, V.G. University of Maryland
ABBAS, M.M. SD50
ACHTERBERG, R.K. Science Systems & Applications
ADE, P. University of Cardiff
BARUCCI, A. Observatoire de Paris
BEZARD, B. Observatoire de Paris
BJORAKER, G.L. Goddard Space Flight Center
BRASUNAS, J.C. Goddard Space Flight Center
ET AL.

Exploring the Saturn System in the Thermal Infrared: The Composite Infrared Spectrometer—Abstract Only. For publication in Space Science Reviews, 2004.

FLASAR, F.M. Goddard Space Flight Center
KUNDE, V.G. Univeristy of Maryland
ACHTERBERG, R.K. Science Systems & Applications
CONRATH, B.J. Cornell University
SIMON-MILLER, A.A. Goddard Space Flight Center
NIXON, C.A. University of Maryland
GIERASCH, P.J. Cornell University
ROMANI, P.N. Goddard Space Flight Center
ABBAS, M.M. SD50
ET AL.

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FORBES, J.C. TD62
XENOFOS, G.D. TD62
FARROW, J.L. Qualis Corporation/TD62
TYLER, T. TD63
WILLIAMS, R. TD64
SARGENT, S. Boeing/Rocketdyne
MOHAROS, J. Boeing/Rocketdyne

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GORTI, S. SD46
PUSEY, M.L. SD46

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FOX, N.J. SD50
GOLDBERG, R. SD50
BARNES, R.J. SD50
SIGWARTH, J.B. SD50
BEISSER, K.B. SD50
MOORE, T.E. SD50
HOFFMAN, R.A. SD50
RUSSELL, C.T. SD50
SPANN, J.F. SD50
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FULLER, K.A. UAH
SMITH, D.D. SD46

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FUSS, T. University of Missouri-Rolla
RAY, C.S. SD46
LESHER, C.E. University of California-Davis
DAY, D.E. University of Missouri-Rolla
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GALLAGHER, D.L. SD50
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ADRIAN, M.L. SD50
LIEMOHN, M.W. SD50
The Origin and Evolution of Deep Plasmaspheric Notches—Abstract Only. For presentation at the Inner Magnetosphere Interactions Workshop, Yosemite, CA, February 2–7, 2004, and presentation at and publication in Proceedings of the Fall AGU 2004 Meeting, San Francisco, CA, Decem-ber 13–17, 2004.

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KHAZANOV, G.V. SD50
Unresolved Issues With Inner Magnetosphere-Ionosphere Coupling—Abstract Only. For presentation at the Outer Radiation Belt Injection, Transport, Acceleration, and Loss Satellite (ORBITALS) Workshop, Banff, Alberta, Canada, September 23–24, 2004.

GARBE, G. TD05
MONTGOMERY IV, E.E. TD05
HEATON, A.F. TD05
VAN SANT, J.T. GSFC
CAMPBELL, B.A. GSFC
NASA's Integrated Development of Solar Sail Propulsion Project—Final Paper. For presentation at the AIAA/AAS Space Flight Dynamics Meeting, Maui, HI, February 10, 2004.

GARCIA, R. TD64
GRIFFIN, L. TD64
WILLIAMS, R. TD64
Overview of MSFC's Applied Fluid Dynamics Analysis Group Activities—Presentation. For presentation at the MSFC Spring Fluid Workshop, MSFC, AL, April 13, 2004.

GARY, G.A. SD50
MOORE, R.L. SD50
Eruption of a Multiple-Turn Helical Magnetic Flux Tube in a Large Flare: Evidence for External and Internal Reconnection that Fits the Breakout Model of Solar Magnetic Eruptions—Abstract Only. For publication in The Astrophysical Journal, 2003.

GATLIN, P.N. SD60
GOODMAN, S.J. SD60
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GERMANY, G. UAH
SPANN, J.F. SD50
DEVERAPALLI, C. UAH
HUNG, C.-C. Southern Polytechnic State University
The Utility of Auroral Image-Based Activity Metrics—Abstract Only. For presentation at and publication in Proceedings of the Fall AGU Meeting, San Francisco, CA, December 12–17, 2004.

GEVEDEN, R.D. DD01
An Overview of the Gravity Probe B Mission—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

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ENGEL, H.P. SD40
CARPENTER, P.K. SD40
Computed Tomography and its Application for the 3D Characterization of Coarse Gained Meteorites—Abstract Only. For presentation at the Microscopy and Microanalysis 2004 Conference, Savannah, GA, August 1–5, 2004.

GOGUS, E. SD50
FINGER, M.H. SD50
KOUVELIOTOU, C. SD50
WOODS, P.M. SD50

PATEL, S.K. SD50
RUPEN, M. SD50
SWANK, J.H. SD50
MARKWARDT, C.B. SD50
VANDERKLIS, M. SD50
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KELTON, K.F. SD46
ROGERS, J.R. SD46
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GONZALEZ, J.E. Santa Clara University
LUVALL, J. SD60
RICKMAN, D. SD60
COMARAZAMY, D.E. SD60
PICON, A. SD60
Analysis of Upper Air, Ground and Remote Sensing Data for the ATLAS Field Campaign in San Juan, Puerto Rico—Abstract Only. For presentation at and publication in Proceedings of the 85th AMS Annual Meeting, San Diego, CA, January 9–13, 2005, and publication in Remote Sensing of Environment, 2004.

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REGNER, K. UAH
CONOVER, H. UAH
ASHCROFT, P. Remote Sensing Systems
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CONWAY, D. UAH
LOBL, E. UAH
BEAUMONT, B. UAH
HAWKINS, L. UAH
JONES, S. UAH
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BLAKESLEE, R.J. SD60
CHRISTIAN, H. SD60
KOSHAK, W. SD60
BAILEY, J.C. Global Hydrology & Climate Center
HALL, J. Global Hydrology & Climate Center
MCCAUL, E. Global Hydrology & Climate Center
BUECHLER, D.E. Global Hydrology & Climate Center
DARDEN, C. NSSTC
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JEDLOVEC, G.J. SD60
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FORSYTHE, E.L. BAE Systems
PUSEY, M.L. SD46
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KONNERT, J. Naval Research Laboratory
FORSYTHE, E.L. BAE Systems/SD46
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HERREN, K.A. SD70
Specific Impulse Definition for Ablative Laser Propulsion—Abstract Only. For presentation at the Third International Symposium on Beamed Energy Propulsion, Troy, NY, October 11–13, 2004.

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KLOSE, S. Thuringer Landesstern.
REINSCH, K. Universitats-Sternwarte
SCHMID, H.M. Institut fur Astronomie
SARI, R. California Institute of Technology
HARTMANN, D.H. Clemson University
KOUVELIOTOU, C. SD50
RAU, A. Max Planck Institute
PALAZZI, E. Istituto di Astrofisica
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ANILKUMAR, A.V. SD46
LEE, C.P. SD46
Direct Observation of Pore Formation and Bubble Mobility During Controlled Melting and Resolidification in Microgravity—Abstract Only. For presentation at and publication in Proceedings of the Minerals Metals & Materials Society (TMS) Annual Meeting, Charlotte, NC, March 14–18, 2004.

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LUZ, P. SD46
SMITH, A. SD46
SPIVEY, R. SD46
SEN, S. SD46
ANIKUMAR, A.V. SD46
The Pore Formation and Mobility Investigation: The Apparatus, Operations, Science Obtained, and Potential for Continued Usage—Abstract Only. For presentation at the Institute of Electrical and Electronics Engineers—Lasers and Electro-Optics Society Meeting, San Diego, CA, June 28–30, 2004.

GUBAREV, M. SD50
O'DELL, S.L. SD50
KESTER, T. SD50
LEHNER, D. SD50
JONES, W. SD50
SMITHERS, M. SD50
Incoming Metrology of Segmented X-Ray Mandrels at MSFC—Abstract Only. For presentation at SPIE Astronomical Telescopes & Instrumentation, Glasgow, Scotland, June 21–25, 2004.

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RAMSEY, B.D. SD50
APPLE, J. SD50
Performance of Gas Scintillation Proportional Counter Array for High-Energy X-Ray Observatory—Abstract Only. For presentation at SPIE Astronomical Telescopes & Instrumentation, Glasgow, Scotland, June 21–25, 2004.

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NASA Earth Science Research and Applications Using UAV's—Abstract Only. For presentation at the Technical Analysis and Applications Center 2003 UAV Conference, Albuquerque, NM, October 28–30, 2003.

HADAWAY, J. UAH
STAHL, P. SD72
ENG, R. SD72
HOGUE, W. SD72
Cryogenic Test Results of Hextek Mirror—Abstract Only. For presentation at the Mirror Technology Days 2004, Huntsville, AL, August 17–19, 2004.

HAINES, S.L. SD60
JEDLOVEC, G.J. SD60
LAFONTAINE, F.J. SD60
Spatially Varying Spectrally Thresholds for MODIS Cloud Detection—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.

HALE, J. TD32
Simulation Based Acquistion for NASA's Office of Exploration Systems—Abstract Only. For presentation at the Huntsville Simulation Conference, Huntsville, AL, October 19–21, 2004.

HAMILTON, G.S. ED42
DUMAS II, J.D. University of Tennessee
BROOKMAN, S. University of Maryland
TILGHMAN, N. QTEC
Evaluating the Usability of Pinchigator, A System for Navigating Virtual Worlds Using Pinch Gloves—Abstract Only. For presentation at the Huntsville Simulation Conference, Huntsville, AL, October 29–31, 2003.

HANSON, J.M. TD54
HALL, C.E. TD54
MULQUEEN, J.A. TD54
JONES, R.E. TD54
Advanced Guidance and Control for Hypersonics and Space Access—Final Paper. For presentation at the JANNAF Interagency Propulsion Committee Joint Meeting, Colorado Springs, CO, December 1–5, 2003.

HANSON, J.M. TD54
JONES, R.E. Sverdrup Technology
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Test Results for Entry Guidance Methods for Space Vehicles—Final Paper. For publication in the AIAA Journal of Guidance, Control, and Dynamics, 2004.

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Modern Solar Mysteries—Abstract Only. For presentation at Vanderbilt University—Public Lecture, Nashville, TN, April 8, 2004.

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What the Long-Term Sunspot Record Tells Us About Space Climate—Abstract Only. For presentation at the First International Symposium on Space Weather, Oulu, Finland, June 20–23, 2004.

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Flows in the Solar Convection Zone—Abstract Only. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.

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CHOUDHARY, D.P. SD50
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MEYER, P.J. SD50
TEMPLETON, G. SD50
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NANDY, D. Montana State University
WILSON, R.M. SD50
REICHMANN, E.J. SD50
Erratum: "Evidence that a Deep Meridional Flow Sets the Sunspot Cycle Period—Abstract Only. For publication in The Astrophysical Journal, 2003.

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WILSON, R.M. SD50

What the Sunspot Record Tells Us About Space Climate—Abstract Only. For publication in the Solar Physics Journal, 2004.

HEATON, A.F. TD54
Solar Sail GN&C Model Comparisons—Final Paper. For presentation at the AIAA GN&C Conference, Providence, RI, August 16–19, 2004.

HEFNER, K. FD03
DAVIDSON, G. Northrop Grumman
Performance as Promised: How the Chandra X-Ray Observatory Accomplished One of NASA's Most Challenging Missions for Billions of Dollars Less Than Originally Planned—Final Paper. For presentation at the AIAA Space 2004 Conference, San Diego, CA, September 28–30, 2004.

HENDERSON, S.J. U.S. Military Academy
HAMILTON, G.S. ED42
Human Motion Tracking at Marshall Space Flight Center's Collaborative Engineering Center ANVIL—Abstract Only. For presentation at the Huntsville Simulation Conference, Huntsville, AL, October 19–21, 2004.

HENLEY, M.W. Boeing/Phantom Works
HOWELL, J.T. FD02
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HEREFORD, J. Murray State University
GWALTNEY, D. ED17
Design Space Issues for Intrinsic Evolvable Hardware—Abstract Only. For presentation at the 2004 NASA/DoD Conference on Evolvable Hardware, Seattle, WA, June 24–26, 2004.

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GWALTNEY, D. ED17
Scalability, Timing, and System Design Issues for Intrinsic Evolvable Hardware—Final Paper. For publication in Genetic Programming and Evolvable Machines, 2004.

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COHEN, T. UAH
LIN, J. UAH
PAKHOMOV, A.V. UAH
Two-Pulsed Technique for Ablative Laser Propulsion: Force Measurement in Vacuum—Abstract Only. For presentation at the Third International Symposium on Beamed Energy Propulsion, Troy, NY, October 11–13, 2004.

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LIN, J. UAH
COHEN, T. UAH
PAKHOMOV, A.V. UAH
THOMPSON, M.S. Information Systems, Inc.
Status of the Ablative Laser Propulsion Studies—Abstract Only. For presentation at the 15th Advanced Space Propulsion Workshop, Pasadena, CA, June 15–17, 2004.

HOLLADAY, J.B. FD24
DAY, G. Boeing
GILL, L. Carleton Technologies
Guidelines for Developing Spacecraft Structural Requirements; A Thermal and Environmental Perspective—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

HOLLADAY, J.B. FD24
REAGAN, S.E. FD24
DAY, G. Boeing
Solid-State Distributed Temperature Control for *International Space Station*—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

HOLLERMAN, W. University of Louisiana
ALBARDO, T. University of Louisiana
LENTZ, M. University of Louisiana
EDWARDS, D.L. ED31
HUBBS, W.S. ED31
SEMMEL, C.L. Qualis Corporation
Ionizing Radiation Exposure Measurements for Candidate Solar Sails—Final Paper. For presentation at the Joint Propulsion Conference, Huntsville, AL, July 21–23, 2003.

HOLT, J.M. ED25
CLANTON, S.E. Jacobs Sverdrup
Case Study of Risk Mitigation Based on Hardware/Software Integration (HSI) Testing for the *International Space Station* (*ISS*) Node 2 Module—Abstract Only. For presentation at the French Aviation & Space Association Complex and Safe Systems Engineering Conference, Paris, France, June 21–22, 2004.

HONG, Y.-S. SD46/BAE Systems
ADAMEK, D.H. SD46/AZ Technology
BRIDGE, K. SD46/UAH
MALONE, C.C. SD46/BAE Systems
YOUNG, R.B. BAE Systems/UAH
MILLER, T. SD46
KARR, L. SD46

Purification and Crystallization of Murine Myostatin a Negative Regulator of Muscle Mass—Abstract Only. For presentation at the American Society for Biochemistry & Molecular Biology, Boston, MA, June 12–16, 2004.

HOOD, R.E. SD60
BLAKESLEE, R.J. SD60
CECIL, D.J. UAH
LAFONTAINE, F.J. Raytheon ITSS
HEYSFIELD, G. Goddard Space Flight Center
MARKS, F. NOAA Hurricane Research Division
Tropical Cyclone Precipitation Types and Electrical Field Information Observed by High Altitude Aircraft Instrumentation—Abstract Only. For presentation at the 26th AMS Conference on Hurricanes & Tropical Meteorology, Miami, FL, May 3–7, 2004.

HOOD, R.E. SD60
KAKAR, R. NASA Headquarters
Early Results of the NASA Convection and Moisture Experiment (CAMEX)—Abstract Only. For presentation at the 58th Interdepartmental Hurricane Conference, Charleston, SC, February 29–March 5, 2004.

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PIKUTA, E.V. SD50
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PIKUTA, E.V. SD50
WICKRAMASINGHE, N.C. Cardiff Center
WALLIS, M.K. Cardiff Center
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ROZANOV, A.Y. Paleontological Institute
New Evidence for the Presence of Indigenous Microfossils in Carbonaceous Chondrites—Abstract Only. For presentation at and publication in Proceedings of the International Society for Optical Science and Technology 49th Annual Meeting, Vol. 5555, Denver, CO, August 2–6, 2004.

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ROZANOV, A.Y. Paleontological Institute
JERMAN, G. ED21
COSTEN, J. ED21
Microfossils in C1 and CO Carbonaceous Meteorites—Abstract Only. For presentation at and publication in Proceedings of SPIE—The International Society for Optical Science and Technology 48th Annual Meeting, Vol. 5163, San Diego, CA, August 3–8, 2003.

HOUSTON, J. Jacobs Sverdrup
GATTIS, C.B. ED21
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HOWARD, R.T. ED19
JOHNSTON, A.S. ED19
BRYAN, T.C. ED19
BOOK, M.L. ED19
Advanced Video Guidance Sensor (AVGS) Development Testing—Final Paper. For presentation at the SPIE Defense and Security Symposium, Orlando, FL, April 12–16, 2004.

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MANKINS, J.C. NASA Headquarters
Transformational System Concepts and Technologies for Our Future in Space—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.

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O'NEILL, M. Entech, Inc.
FORK, R. UAH
Advanced Receiver/Converter Experiments for Laser Wireless Power Transmission—Abstract Only. For presentation at the Fourth International Conference on Solar Power From Space, Granada, Spain, June 30–July 2, 2004.

HOWSMAN, T.G. Dynamic Concepts
O'NEIL, D.A. FD02
CRAFT, M.A. Dynamic Concepts
A Stigmergic Cooperative Multi-Robot Control Architecture—Final Paper. For presentation at the Ninth International Conference on the Simulation and Synthesis of Living Systems, Boston, MA, September 12–15, 2004.

HU, Z.W. SD46
HOLMES, A. SD46
THOMAS, B.R. SD46
CHERNOV, A.A. SD46
CHU, Y.S. Argonne National Laboratory
LAI, B. Argonne National Laboratory
X-Ray Microscopic Characterization of Protein Crystals—Abstract Only. For presentation at the 10th International

Conference on the Crystallization of Biological Macromolecules, Beijing, China, June 5–8, 2004.

HULCHER, A.B. ED34
Film Processing Module for Automated Fiber Placement—Presentation. For presentation at the SAMPE Conference, NASA Technical Briefings Session, Long Beach, CA, May 19, 2004.

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Automated Composites Processing Technology: Film Module—Abstract Only. For publication in the AIAA Aerospace America Magazine, 2004.

HUTCHENS, C. FD21
GRAVES, R. Allied
Results of the Vapor Compression Distillation Flight Experiment (VCD-FE)—Abstract Only. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

HYERS, R.W. University of Massachusetts
BRADSHAW, R.C. University of Massachusetts
ROGERS, J.R. SD46
RATHZ, T.J. UAH
LEE, G.W. Washington University
GANGOPADHYAY, A.K. Washington University
KELTON, K.F. Washington University
Containerless Measurement of Thermophysical Properties of Ti-Zr-Ni Alloys—Abstract Only. For presentation at the Minerals, Metals, & Materials Society (TMS) Annual Meeting, Charlotte, NC, March 14–18, 2004.

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Land Use and Change—Abstract Only. For presentation at the Mesoamerican Environmental Information System—NASA Monitoring and Visualization System (SIAM-SERVIR) Workshop, Panama City, Panama, July 10–17, 2004, and August 16–20, 2004.

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SEVER, T.L. SD60
GRAVES, S. UAH
HARDIN, D. UAH
SIAM-SERVIR: An Environmental Monitoring and Decision Support System for Mesoamerica—Abstract Only. For presentation at and publication in Proceedings of the Monitoring Science and Technology Symposium, Denver, CO, September 20–24, 2004.

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DAVIS, E. FD42
An Enabling Technology for New Planning and Scheduling Paradigms—Final Paper and Presentation. For presentation at the SpaceOps 2004, Montreal, Quebec, Canada, May 17–21, 2004.

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Maximally Expressive Modeling—Final Paper. For presentation at the Fourth International Workshop on Planning and Scheduling for Space, Darmstadt, Germany, June 23–25, 2004.

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MAXWELL, T. FD42
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JACOBSON, D. XP01
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HAINES, S. UAH
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BRADSHAW, T. NWS Forecast Office
BURKS, J. NWS Forecast Office

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VAUGHAN, W.W. UAH

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JOHNSON, L. TD05
ALEXANDER, L.A. TD05
BAGGETT, R.M. TD05
BONOMETTI, J.A. TD05
HERRMANN, M. TD05
JAMES, B.F. TD05
MONTGOMERY, S.E. TD05

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JOHNSON, L. TD05
BISHOP-BEHEL, K. TD05

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JONES, P.R. SD60
JEDLOVEC, G.J. SD60
SUGGS, R.J. SD60
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Application of Satellite-Derived Land Surface Temperature to Minimum Temperature Forecasting—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.

JUDGE, R.A. SD40
SNELL, E.H. BAE Systems/SD40
KEPHART, R. SD40
VAN DER WOERD, M.J. BAE Systems/SD40

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JUSTUS, C.G. Morgan Research Corporation/ED44
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KELLER, V.W. ED44

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KELLER, V.W. ED44

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KELLER, V.W. ED44

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KAKAR, R. NASA Headquarters
GOODMAN, H.M. SD60
HOOD, R.E. SD60
GUILLORY, A.R. SD60
Overview of the Convection and Moisture Experiment (CAMEX)—Abstract Only. For publication in the Journal of Atmospheric Science, 2004.

KAUFFMAN, B. ED03
HARDAGE, D. ED03
MINOR, J. ED03
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KEYS, A.S. SD50
CROW, R.W. Sensing Strategies, Inc.
ASHLEY, P.R. U.S. Army Aviation
NELSON, JR., T.R. Air Force Laboratory, SNDD
PARKER, J.H. Air Force Laboratory, SNJT
BEECHER, E.A. Air Force Laboratory, SNJT
Fabrication and Testing of Binary-Phase Fourier Gratings for Nonuniform Array Generation—Final Paper. For presentation at the Optical Society of America's Diffractive Optics and Micro-Optics Conference, Rochester, NY, October 9–13, 2004.

KHAZANOV, G.V. SD50
The Nonlinear Coupling of Alfvén and Lower Hybrid Waves in Space Plasma—Abstract Only. For presentation at the 2004 National Radio Science Meeting, Boulder, CO, January 4–8, 2004.

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Large-and Small-Scale Ring Current Electrodynamic Coupling—Abstract Only. For presentation at the 30th Anniversary Yosemite Workshop on Inner Magnetosphere Interaction, Yosemite, CA, February 3–6, 2004.

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SPANN, J.F. SD50
SINGH, N. UAH
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LIEMOHN, M.W. University of Michigan
FOK, M.-C. Goddard Space Flight Center
NEWMAN, T.S. UAH
RIDLEY, A.J. University of Michigan
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SINGH, N. UAH
GAMAYUNOV, K.V. University of Alaska Fairbanks
KRIVORUTSKY, E.N. SD50
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KIESSLING, E. ED01
Organizational Considerations in Managing System Safety: A NASA Case Study—Abstract Only. For presentation at the American Society for Engineering Management, Alexandria, VA, October 20–23, 2004.

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TIPPETT, D.D. UAH
SHIVERS, H. ED01
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KLEIMAN, J.I. Integrity Testing Laboratory
GUDIMENKO, Y. Integrity Testing Laboratory
ISKANDEROVA, Z.A. Integrity Testing Lab.
GRIGOREVSKI, A. Public Joint Stock Co.

EDWARDS, D.L. ED31
FINCKENOR, M. ED31
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KLOSE, S. Thuringer Landessternwarte
GREINER, J. Max Planck Institute
RAU, A. Max Planck Institute
HENDEN, A.A. USNO/USRA
HARTMANN, D.H. Clemson University
ZEH, A. Thuringer Landessternwarte
MASETTI, N. Istituto di Astrofisica
GUENTHER, E. Thuringer Landessternwarte
KOUVELIOTOU, C. SD50
ET AL.
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HENDEN, A.A. U.S. Naval Observatory
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ZEH, A. Thuringer Landessternwarte
RIES, C. Wendelstein-Observatorium
MASETTI, N. Istituto di Astrofisica
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GEPPERT, U. Astrophysical Institute
HARTMANN, D.H. Dept./Physics & Astronomy
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LUGINBUHL, C.B. U.S. Naval Observatory
STECKLUM, B. Thuringer Landesstern.
VRBA, F.J. U.S. Naval Observatory
A Deep Near-Infrared Survey of the N49 Region Around the Soft Gamma-Ray Repeater 0526-66—Abstract Only. For publication in The Astrophysical Journal Letters, 2004.

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MULLOTH, L.M. SAIC
AFFLECK, D.L. SAIC
Integrated Testing of a 4-Bed Molecular Sieve and a Temperature-Swing Absorption Compressor for Closed-Loop Air Revitalization—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

KOBELL, W. SD70
A Novel and New Ultra-Lightweight Reinforcement for Producing Low Mass Optical Systems—Abstract Only. For presentation at the Mirror Technology Days, Huntsville AL, August 17–19, 2004.

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ESKRIDGE, R. TD40
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MARTIN, A. TD40
Magnetic and Langmuir Probe Measurements on the Plasmoid Thruster Experiment (PTX)—Abstract/Final Paper. For presentation at the 40th AIAA Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.

KOLODZIEJCZAK, J.J. SD31
Lessons for STEP From GP-B—Abstract Only. For presentation at Testing the Equivalence Principle on Ground and in Space, Pescara, Italy, September 20–24, 2004.

KOROTCHKINA, L.G. State University of NY/Buffalo
CISZAK, E.M. SD46
PATEL, M.S. State University of NY/Buffalo
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Observations of Magnetars—Abstract Only. For presentation at The Electromagnetic Spectrum of Neutron Stars Conference, Marmaris, Turkey, June 13–18, 2004.

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Observations of X-Ray Afterglows—Abstract Only. For presentation at the Workshop on Gamma-Ray Bursts and Supernovae Connection, Seattle, WA, July 5–7, 2004.

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KOUVELIOTOU, C. SD50
WOOSLEY, S.E. University of California
PATEL, S.K. SD50
LEVAN, A. University of Leicester
BLANDFORD, R. Kavli Inst. for Particle Astophysics and Cosmology
RAMIREZ-RUIZ, E. Institute for Advanced Study
WIJERS, R.A.M.J. University of Amsterdam
WEISSKOPF, M.C. SD50
TENNANT, A.F. SD50
ET AL.

Chandra Observations of the X-Ray Environs of SN 1998bw/GRB 980425—Abstract Only. For publication in The Astrophysical Journal, 2004.

KULPA, V. QS10

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LAPENTA, W.M. SD60
BRADSHAW, T. NWS Forecast Office
BURKS, J. NWS Forecast Office
DARDEN, C. NWS Forecast Office
DEMBEK, S. USRA

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LEAHY, F.B. ED44

Evaluation of the Space Shuttle Transatlantic Abort Landing Atmospheric Sounding System—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

LEE, G.W. Washington University
GANGOPADHYAY, A.K. Washington University
KELTON, K.F. Washington University
HYERS, R.W. University of Massachusetts
RATHZ, T.J. UAH
ROGERS, J.R. SD50

A Liquid-Liquid Transition in an Undercooled Ti-Zr-Ni Liquid—Abstract Only. For publication in Nature, 2003.

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Difference in Icosahedral Short-Range Order in Early and Late Transition Metals Liquids—Abstract Only. For publication in Physical Review Letters, 2003.

LEE, J.A. ED33

Commercialization of NASA's High Strength Cast Aluminum Alloy for High Temperature Applications—Abstract and Presentation. For presentation at the 28th Annual Conference on Composites, Materials & Structures, Cocoa Beach, FL, January 26–30, 2004.

LEE, J.A. ED33

High Strength and Compatible Aluminum Alloy for Hydrogen-Peroxide Fuel Tanks—Abstract Only. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.

LEE, J.K. UAH
NEWMAN, T.S. UAH
GARY, G.A. SD50

Automated Detection of Solar Loops by the Oriented Connectivity Method—Final Paper. For presentation at and publication in Proceedings of the 17th International Conference on Pattern Recognition, Cambridge, UK, August 23–26, 2004.

LEIMKUEHLER, T.O. Honeywell, Inc.
LUKENS, C. Honeywell, Inc.
REEVES, D.R. The Boeing Company
HOLT, J.M. ED25

Recent Operational Experience With the Internal Thermal Control System Dual-Membrance Gas Trap—Final Paper. For presentation at the 2004 International Conference on Environmental Systems (ICES) 24th Annual Meeting, Colorado Springs, CO, July 19–22, 2004.

LEIMKUEHLER, T.O. Honeywell, Inc.
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LI, C. UAB
BAN, H. UAB

LIN, B. UAB
SCRIPA, R.N. UAB
SU, C.-H. SD46
LEHOCZKY, S.L. SD46
Temperature Dependence of Density, Viscosity, and Electrical Conductivity for Hg-Based II–VI Semiconductor Melts—Abstract Only. For publication in the Journal of Crystal Growth, 2004.

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SCRIPA, R.N. UAB
Electrical Conductivity of HgTe at High Temperatures—Abstract Only. For presentation at the 2004 Materials Research Society (MRS) Fall Meeting, Boston, MA, November 29–December 3, 2004.

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LIN, B. SD46
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SU, C.-H. SD46
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ZHU, S. SD46
Transient Torque Method: A Fast and Non-Intrusive Technique to Simultaneously Determine Viscosity and Electrical Conductivity of Semiconducting and Metallic Melts—Abstract Only. For publication in Review of Scientific Instruments, 2003.

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Thermophysical Properties of Selected II–VI Semiconducting Melts—Abstract Only. For presentation at the 4th International Conference on Solidification and Gravity, Miskolc, Hungary, September 6–10, 2004.

LIEMOHN, M.W. University of Michigan
KHAZANOV, G.V. SD50
Magnetosphere-Ionosphere Coupling and Associated Ring Current Energization Processes—Abstract Only. For publication in the American Geophysical Union Monograph on Astrophysical Particle Acceleration in Geospace and Beyond, 2004.

LIEMOHN, M.W. SD50
RIDLEY, A.J. SD50
KOZYRA, J.U. SD50
GALLAGHER, D.L. SD50
BRANDT, P.C. SD50
HENDERSON, M.G. SD50
DENTON, M.H. SD50
JAHN, J.M. SD50
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Conductance Effects on Inner Magnetospheric Plasma Morphology: Model Comparisons With IMAGE EUV, MENA and HENA Data—Abstract Only. For presentation at the Spring AGU 2004 Meeting, Montreal, Quebec, Canada, and publication in Proceedings of the 2004 Joint Assembly, AGU, CGU, & Society of Exploration Geophysicts, 2004.

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Propulsion and Power Technologies for The NASA Exploration Vision: A Research Perspective—Presentation. For presentation at the Symposium on MHD Electrical Power Generation and Related Technology, Tsukuba Science City, Japan, September 10, 2004.

LOVELACE, J. SD46
SOARES, A.S. SD46
BELLAMY, H. SD46
SWEET, R.M. SD46
SNELL, E.H. SD46
BORGSTAHL, G. SD46
First Results of Digital Topography Applied to Macromolecular Crystals—Abstract Only. For publication in the Journal of Applied Crystallography, 2004.

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BLAKESLEE, R.J. SD60
BAILEY, J.C. Raytheon ITSS
FARRELL, W.M. Goddard Space Flight Center
GOLDBERG, R.A. Goddard Space Flight Center
DESCH, M.D. Goddard Space Flight Center
HOUSER, J.G. Goddard Space Flight Center
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HO, F.D. UAH
Ferroelectric Field Effect Transistor Model Using Partitioned Ferroelectric Layer and Partial Polarization—Abstract Only. For presentation at The 16th International Symposium on Integrated Ferroelectrics, Gyeongiu, Korea, April 8, 2004, and for publication in the Integrated Ferroelectric Journal, 2004.

MADDOX, W. UAH/CSPAR
SPANN, J.F. SD50
GERMANY, G. UAH/CSPAR
Correlation of Far Ultraviolet Lunar Albedo With Solar Activity—Abstract Only. For presentation at and publication in Proceedings of the Fall AGU 2004 Meeting, San Francisco, CA, December 13–17, 2004.

MAJUMDAR, A. ED25
Numerical Modeling of Conjugate Heat Transfer in Fluid Network—Abstract Only. For presentation at the 2004 15th Annual Thermal & Fluids Analysis Conference, Philadelphia, PA, August 30–September 3, 2004.

MAKAL, A. SD46
HONG, Y.-S. SD46
POTTER, R. SD46
VETTAIKKORUMAKANKAUV, A.K. SUNY
KOROTCHKINA, L.G. SUNY
PATEL, M.S. SUNY
CISZAK, E.M. SD46
Intricate Crystal Structure of Dihydrolipoamide Dehydrogenase (E3) With its Binding Protein: Multiple Copies, Dynamic and Static Disorders—Abstract Only. For presentation at the American Crystallographic Association, Chicago, IL, July 17–22, 2004.

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MOSES, K. Futron Corporation
Development of Risk Assessment Matrix for NASA Engineering and Safety Center—Final Paper. For presentation at the Risk Analysis: The Profession and the Future, Wyndham Palm Springs, CA, December 5–8, 2004.

MANGUS, D. TD54
HEATON, A.F. TD54
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Liquid-Metal-Fed Pulsed Electromagnetic Thrusters for In-Space Propulsion—Final Paper. For presentation at the JANNAF Conference, Las Vegas, NV, May 10–13, 2004.

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Thrust Stand for Electric Propulsion Performance Evaluation—Abstract/Final Paper. For presentation at the Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.

MARTIN, A. TD40
ESKRIDGE, R. TD40
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Progress on the Plasmoid Thruster Experiment (PTX)—Abstract Only. For presentation at the 40th AIAA Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.

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The Plasmoid Thruster Experiment (PTX)—Abstract Only. For presentation at the American Physical Society 46th Annual Meeting of the Division of Plasma Physics, Savannah, GA, November 15–19, 2004.

MARTIN, J.J. TD40
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Sodium Based Heat Pipe Modules for Space Reactor Concepts: Stainless Steel SAFE-100 Core—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants, Pittsburg, PA, June 13–17, 2004.

MARTIN, J.J. TD40
SALVAIL, P. Morgan Research Corporation
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MARTIN, M.A. TD53
NGUYEN, H.H. TD53
GREENE, W.D. TD53
SEYMOUR, D C. TD53/ERC, Inc.
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MAY, G. Institute for Technology Development
MITCHELL, B. SD10
Imaging Beyond What Man Can See—Abstract Only. For presentation at the Monitoring Science and Technology Symposium, Denver, CO, October 21–24, 2004.

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VOLZ, M.P. SD46
Lorentz Body Force Induced by Traveling Magnetic Fields—Abstract Only. For publication in the Journal Magnetohydrodynamics, 2003.

MCCAUL, JR., E.W. SD60
COHEN, C. USRA/SD60
KIRKPATRICK, C. UAH
The Sensitivity of Simulated Storm Structure and Intensity to the Temperature at the Lifted Condensation Level—Abstract Only. For publication in the Monthly Weather Review, 2004.

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Space Environmental Effects and Spacecraft EMC—Presentation. For presentation at the 2004 IEEE EMS Symposium, Santa Clara, CA, August 9–13, 2004.

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JONES, J. University of Western Ontario
KAUFFMAN, B. ED44
SUGGS, R.M. ED44
COOKE, W.J. Morgan Research Corporation/ED44
SMITH, S. Morgan Research Corporation/ED44
Meteoroid Engineering Model (MEM): A Meteoroid Model for the Inner Solar System—Abstract Only. For presentation at the Meteoroids Conference 2004, London, Ontario, Canada, August 16–20, 2004.

MCNEAL, JR., C.I. TD07
Bantam: A Cautionary Tale—Presentation. For presentation at the Space 2004 Conference and Exposition, San Diego, CA, September 28–30, 2004.

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A Decade of X-Vehicles: Lessons Learned—Presentation. For presentation at Space 2004 Conference and Exposition, San Diego, CA, September 28–30, 2004.

MEEGAN, C.A. SD50
The GLAST Burst Monitor—Abstract Only. For presentation at the American Physical Society, Denver, CO, May 1–4, 2004.

MEINHOLD, A. MP71
Shuttle Environmental Assurance (SEA) Initiative—Presentation. For presentation at the U.S. Army Materials Command Environmental Office, Madison, AL, June 2–3, 2004.

MINAMITANI, E.F. BAE Systems
PUSEY, M.L. SD46
Flourescent Approaches to High Throughput Crystallaography—Abstract Only. For presentation at the 10th International Conference on the Crystallization of Biological Macromolecules, Beijing, China, June 5–8, 2004.

MINAMITANI, E.F. BAE Systems
PUSEY, M.L. SD46
Solution-Phase Processes of Macromolecular Crystallization—Abstract Only. For presentation at the 10th International Conference on the Crystallization of Biological Macromolecules, Beijing, China, June 5–8, 2004.

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ALSTATT, R.L. Jacobs Sverdrup/ED44
NEERGAARD, L.F. Jacobs Sverdrup/ED44
Interplanetary Radiation and Internal Charging Environment Models for Solar Sails—Abstract Only. For presentation at the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–29, 2004.

MITCHELL, D.W. XP01
X-37 Flight Demonstrator—X-40A Flight Test Approach—Presentation. For presentation at the Space Technology and Applications International Forum, Albuquerque, NM, February 11, 2004.

MONACO, L. SD46
Lab on a Chip Application Development for Exploration—Abstract Only. For presentation at the Mars Astrobiology Science and Technology Workshop, Washington, DC, September 8–10, 2004.

MONTGOMERY IV, E.E. TD05
JOHNSON, L. TD05
The Development of Solar Sail Propulsion for NASA Science Missions to the Inner Solar System—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 5th AIAA Gossamer Spacecraft Forums, Palm Springs, CA, April 19–24, 2004.

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JOHNSON, L. TD05
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MOORE, R.L. SD50
FALCONER, D.A. UAH
PORTER, J.G. SD50
HATHAWAY, D.H. SD50
YAMAUCHI, Y. SD50
Coronal Heating, Spicules, and Solar-B—Abstract Only. For presentation at and publication in Proceedings of the Fifth Solar-B Science Meeting, Tokyo, Japan, November 14, 2003.

MOORE, R.L. SD50
FALCONER, D.A. SD50
STERLING, A.C. SD50
Main-Sequence CME's as Magnetic Explosions: Compatibility With Observed Kinematics—Abstract Only. For presentation at the 2004 Shine Workshop, Big Sky, MT, June 26–July 2, 2004.

MOORE, R.L. SD50
STERLING, A.C. SD50
Compact Flares and CMEs—Abstract Only. For presentation at the RHESSI/SOHO/TRACE Workshop: Coordinated Observations of Flares and CME's, Sonoma, CA, December 8–11, 2004.

MOORE, R.L. SD50
YAMAUCHO, Y. NJIT
Solar Magnetic Explosions, Spicules, and the Heliosphere—Abstract Only. For presentation at and publication in Proceedings of the 2004 Conference of the American Astronomical Society/Solar Physics Division, Denver, CO, May 30–June 3, 2004.

MORRIS, C.I. TD40
Numerical Modeling of Pulse Detonation Rocket Engine Gasdynamics and Performance—Final Paper and Presentation. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004, and for publication in the Journal of Propulsion and Power, 2004.

NALL, M.E. SD10
Meeting NASA's Mission Through Commercial Partnerships—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 4–8, 2004.

NALL, M.E. SD10
CASAS, J. SD10
Accelerating Exploration Through the Sharing of Best Practices in Research Partnerships—Abstract Only. For presentation at the 24th International Symposium on Space Technology and Science, Miyazaki, Japan, May 30–June 6, 2004.

NALL, M.E. SD10
CASAS, J. SD10
Space Exploration Technologies Developed Through Existing and New Research Partnerships Initiatives—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.

NEERGAARD, L.F. Jacobs Sverdrup/ED44
DAVIS, V.A. SAIC
GARDNER, B. SAIC
MANDELL, M. SAIC
MINOW, J.I. ED44
Analysis of Surface Charging for a Candidate Solar Sail Mission Using Nascap-2k—Abstract Only. For presentation at the Solar Sail Technology and Applications Conference, Greenbelt, MD, September 28–29, 2004.

NESTEROV, V.V. New Mexico Highlands University
ANTIPIN, M.Y. New Mexico Highlands University
NESTEROV, V.N. New Mexico Highlands University
MOORE, C.E. SD46
CARDELINO, B.H. Spellman College
TIMOFEEVA, T.V. New Mexico Highlands University
Thermally Stable Heterocyclic Imines as New Potential Nonlinear Optical Materials—Abstract Only. For publication in the Journal of Physical Chemistry B, 2004.

NETTLES, A.T. ED34
Allowables for Structural Composites—Abstract Only. For presentation at the International Conference on Composite Engineering, Hilton Head, SC, August 8–14, 2004.

NEVALAINEN, J. SD50
OOSTERBROEK, T. SD50
BONAMENTE, M. SD50
COLAFRANCESCO, S. SD50

Non-Thermal Hard X-Ray Emission in Galaxy Clusters Observed With the BeppoSAX PDS—Abstract Only. For publication in The Astrophysical Journal, 2003.

NEWCHURCH, M.J. UAH
FULLER, K.A. UAH
BOWDLE, D.A. UAH
JOHNSON, S. SD60
KNUPP, K.R. UAH
GILLANI, N. UAH
BIAZAR, A. UAH
MCNIDER, R.T. UAH
BURRIS, J. Goddard Space Flight Center
ET AL.

Vertical Profiling of Air Pollution at RAPCD—Abstract Only. For presentation at the SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.

NEWMAN, T.S. UAH
SANTHANAM, N. UAH
ZHANG, H. UAH
GALLAGHER, D.L. SD50

Limited Angle Reconstruction Method for Reconstructing Terrestrial Plasmaspheric Densities From EUV Images—Abstract Only. For presentation at The Applied Information Systems Research Program, Pittsburg, PA, October 28–29, 2003.

NEWTON, R.L. ED10
DAVIDSON, J.L. Vanderbilt University
ICE, G.E. Oak Ridge National Laboratory
LIU, W. Oak Ridge National Laboratory

Synchroton X-Ray Microdiffraction Analysis of Proton Irradiated Polycrystalline Diamond Films—Final Paper. For publication in Diamond and Related Materials, 2004.

NGUYEN, H.H. TD53
MARTIN, M.A. TD53

An Interpolation Method for Obtaining Thermodynamic Properties Near Saturated Liquid and Saturated Vapor Lines—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–14, 2004.

NICHOLS, K.F. FD41
SCHNEIDER, L. COLSA Corporation
BEST, S. FD41

Making Wireless Networks Secure for NASA Mission Critical Applications Using Virtual Private Network (VPN) Technology—Final Paper and Presentation. For presentation at the SpaceOps 2004, Montreal, Quebec, Canada, May 17–21, 2004.

NICHOLS, K.F. FD41
SCHNEIDER, L. COLSA Corporation
BEST, S. FD41

Making Wireless Networks Secure for NASA Mission Critical Applications Using Virtual Private Network (VPN) Technology—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, CA, October 4–8, 2004.

NISHIKAWA, K.I. SD50
HARDEE, P. University of Alabama
RICHARDSON, G. UAH
PREECE, R. UAH
SOL, H. UAH/SD50
FISHMAN, G.J. SD50

Particle Acceleration and Magnetic Field Generation in Electron-Positron Relativistic Shocks—Abstract Only. For publication in The Astrophysical Journal, 2004.

NISHIKAWA, K.I. SD50
HEDEDAL, C. Niels Bohr Institute
HARDEE, P. University of Alabama
RICHARDON, G. SD50
PREECE, R. UAH/SD50
SOL, H. Observatore de Paris-Meudon
FISHMAN, G.J. SD50

Particle Acceleration, Magnetic Field Generation, and Emission in Relativistic Shocks—Abstract Only. For presentation at the Swift Workshop, New Orleans, LA, September 8, 2004; for presentation at and publication in Proceedings of the 8th Meeting of the American Astronomical Society High Energy Astrophysics Division, New Orleans, LA, September 8–11, 2004; and for presentation at the Workshop on Relativistic Plasmas in Magnetic Field, Stanford, CA, August 16–18, 2004.

NISHIKAWA, K.I. SD50
RICHARDSON, G. SD50
KOIDE, S. SD50
SHIBATA, K. SD50
KUDOH, T. SD50
HARDEE, P. SD50
FISHMAN, G.J. SD50

A General Relativistic Magnetohydrodynamics Simulation of Jet Formation With a State Transition—Abstract Only. For publication in The Astrophysical Journal, 2004.

NISHIKAWA, K.I. SD50
YAN, X.Y. SD50
CAI, D.S. SD50
LEMBEGE, B. SD50

Magnetospheric Magnetic Reconnection With Southward IMP by a 3D EMPM Simulation—Abstract Only. For presentation at the Explosive Phenomena in Magnetized

Plasma—New Development of Reconnection Research, Kyoto, Japan, March 17–19, 2004.

NIX, M. TD53
STATON, E.J. Jacobs Sverdrup
Turnaround Time Modeling for Conceptual Rocket Engines—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.

NIXON, C.A. University of Maryland
ACHTERBERG, R.K. Science Systems & Apps.
CONRATH, B.J. Cornell University
IRWIN, P.G.J. University of Oxford
FOUCHET, T. University of Oxford/Meudon
PARRISH, P.D. University of Oxford
ABBAS, M.M. SD50
LECLAIR, A. SD50
ROMANI, P.N. Goddard Space Flight Center
Meridional Variations of C_2H_2 and C_2H_6 in Jupiter's Atmosphere From Cassini CIRS Infrared Spectra—Abstract Only. For publication in Icarus, 2004.

NUNES, JR., A.C. ED33
Plasma Arc Welding: How it Works: A Brief Account of the Physical Principles of PAW—Abstract Only. For publication in The Fabricator, 2004.

OELGOETZ, P. Boeing
JOHNSON, R. Boeing
TODD, D. Boeing
RUSSELL, S. ED32
WALKER, W. ED32
Blind Leak Detection for Closed Systems—Abstract Only. For presentation at the Boeing Technical Excellence Conference, St. Louis, MO, February 24, 2004.

O'NEIL, D.A. FD02
MANKINS, J.C. NASA Headquarters
Advanced Technology Lifecycle Analysis Stem (ATLAS)—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.

OVERBEY, B.G. Raytheon
ROBERTS, B.C. ED44
Extreme Meteorological Parameters During Space Shuttle Pad Exposure Periods—Final Paper. For presentation at the 11th American Meteorological Society Aviation, Range, & Aerospace Meteorological Conference, Hyannis, MA, October 4–8, 2004.

PALOSZ, B. SD46
GIERLOTKA, S. SD46
SWIDERSKA-SRODA, A. SD46
FIETKIEWICZ, K. SD46
KALISZ, G. SD46
GRZANKA, E. SD46
STEL'MAKH, S. SD46
PALOSZ, B. BAE Systems
Combining Hard With Soft Materials in Nonoscale Under High-Pressure, High-Temperature Conditions—Abstract Only. For presentation at and publication in Proceedings of the NATO Advanced Research Workshop—Innovative Superhard Materials and Sustainable Coatings, Kiev, Ukraine, May 12–15, 2004.

PALOSZ, B. SD46
STEL'MAKH, S. SD46
GRZANKA, E. SD46
GIERLOTKA, S. SD46
PALOSZ, B. BAE Systems
High Pressure X-Ray Diffraction Studies of Nanocrystalline Materials—Abstract Only. For presentation at the 22nd European Crystallographic Meeting, Budapest, Hungary, August 26–31, 2004.

PALOSZ, B. SD46
VOLZ, M.P. SD46
COBB, S.D. SD46
MOTAKEF, S. Cape Simulations, Inc.
SZOFRAN, F.R. SD46
Detached Growth of Germanium by Directional Solidification—Abstract Only. For presentation at the 14th International Confernce on Crystal Growth in Conjunction With the 12th International Conference on Vapor Growth and Epitaxy, Grenoble, France, August 9–13, 2004.

PANDEY, A.B. Pratt & Whitney
SHAH, S.R. ED33
SHADOAN, M. TD07
High Strength Discontinuously Reinforced Aluminum for Rocket Applications—Final Paper. For presentation at the TMS Materials Science and Technology Conference, Chicago, IL, November 9–12, 2003.

PANNELL, B. ED42
Using a Genetic Algorithm to Design a Nuclear Electric Spacecraft—Presentation. For presentation at the Huntsville Simulation Conference, Huntsville, AL, October 30–31, 2003.

PANOV, A.D. Moscow State University
ADAMS, J.H. SD50
AHN, H.S. University of Maryland
BASHINDZHAGYAN, G.L. Moscow State University
BATKOV, K.E. Moscow State University
CHANG, J. Max Planck Institute

CHRISTL, M.J. SD50
FAZELY, A.R. Southern University
GANEL, O. University of Maryland
ET AL.
The Energy Spectra of Heavy Nuclei Measured by the ATIC Experiment—Abstract Only. For presentation at and publication in Proceedings of the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.

PARKINSON, D.A. TD51
BROWN, K.K. TD51
Test Planning Approach and Lessons—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.

PATRICK, M.C. ED12
COOPER, A.E. ED12
POWERS, W.T. ED12
Support of Integrated Health Management (IHM) Through Automated Analyses of Flow-Field-Derived Spectrographic Data—Final Paper. For presentation at the JANNAF Interagency Propulsion Committee, Colorado Springs, CO, December 1–5, 2003.

PECK, J. ED21
TORRES, I. ED21
A DMAP Program for the Selection of Accelerometer Locations in MSC/Nastran—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Palm Springs, CA, May 19–22, 2004.

PERRIN, D.J. SD50
SIDMAN, E.D. SD50
MEEGAN, C.A. SD50
BRIGGS, M.S. SD50
CONNAUGHTON, V. SD50
GLAST Burst Monitor Trigger Classification Algorithm—Abstract Only. For presentation at and publication in Proceedings of the High Energy Astrophysics Division of the American Society, New Orleans, LA, September 8–11, 2004.

PIKUTA, E.V. SD50
HOOVER, R.B. SD50
Astrobiological Significance of Chemolithoautotrophic Acidophiles—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 48th Annual Meeting, San Diego, CA, August 3–8, 2003.

PIKUTA, E.V. SD50
HOOVER, R.B. SD50
Potential Application of Anaerobic Extremophiles for Hydrogen Production—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 48th Annual Meeting, San Diego, CA, August 3–8, 2003.

PIKUTA, E.V. SD50
HOOVER, R.B. SD50
Growth of the Facultative Anaerobes From Antarctica, Alaska, and Patagonia at Low Temperatures—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.

PIKUTA, E.V. SD50
HOOVER, R.B. SD50
Oxygen Effect on the Low Temperature Tolerance of Facultative Anaerobes From Antarctica, Alaska, and Patagonia—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.

PIKUTA, E.V. SD50
MARSIC, D. UAH
BEJ, A. UAB
TANG, J. American Type Culture Collection
KRADER, P. American Type Culture Collection
HOOVER, R.B. SD50
Carnobacterium Pleistocaenium sp. nov. a Novel Psychrotolerant, Facultative Anaerobe Isolated From Permafrost of the Fox Tunnel in Alaska—Abstract Only. For publication in the International Journal of Systematic and Evolutionary Microbiology, 2004.

PIVOVAROFF, M.J. SD50
BARBER, W.C. SD50
CRAIG, W.W. SD50
HASAGAWA, B.H. SD50
RAMSEY, B.D. SD50
TAYLOR, C. SD50
Gamma-Ray Focusing Optics for Small Animal Imaging—Abstract Only. For presentation at the IEEE Rome 2004 Medical Imaging Conference, Rome, Italy, October 16–22, 2004.

POLETTO, G. INAF
SUESS, S.T. SD50
JD 7: The Sun and the Heliosphere as an Integrated System—Abstract Only. For publication in the Highlights of Astronomy, 2003.

POLETTO, G. SD50
SUESS, S.T. SD50

The Sun and the Heliosphere as an Integrated System—Abstract Only. For publication in ISBN 1-4020-2830-X, Kluwer Academic Publishers, 2004.

POLETTO, G. SD50
SUESS, S.T. SD50
BEMPORAD, A. SD50
SCHWADRON, N. SD50
ELLIOTT, H.A. SD50
ZURBUCHEN, T. SD50
KO, Y. SD50

Evidence for Hot Plasma After CME Events From Remote and In Situ Observations—Abstract Only. For publication in The Astrophysical Journal Letters, 2004.

POPP, C.G. TD52
ROBINSON, P.J. Aerojet
VEITH, E.M. Aerojet

Ignition Characterization Tests of the LOX/Ethanol Propellant Combination—Abstract Only. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.

POTTER, R. SD46
HONG, Y.-S. SD46
CISZAK, E.M. SD46/UAH

Use of Plastic Capillaries for Macromolecular Crystallization—Abstract Only. For publication in the Journal of Applied Crystallography, 2003.

PRESSON, K. FD24
TRICHILO, M. ALTEC

MPLM Active Mission Preparation: TCS Unique Testing for Risk Mitigation—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

PRICE, M.W. Corning Inc.
SCRIPA, R.N. UAB
SZOFRAN, F.R. SD46
MOTAKEF, S. CAPE Simulations
HANSON, B. Corning Inc.

Analysis of Radial Segregation in Directionally Solidified Hg0.89Mn0.11Te—Abstract Only. For publication in the Journal of Crystal Growth, 2003.

PUSEY, M.L. SD46

Growing Larger Crystals for Neutron Diffraction—Abstract Only. For presentation at the 5th International Symposium on Organized Research Combination System (ORCS), Tokai, Ibaraki, Japan, November 19–21, 2003.

PUSEY, M.L. SD48
LIU, Z.-J. University of Georgia
TEMPEL, W. University of Georgia
PRAISSMAN, J. University of Georgia
LIN, D. University of Georgia
WANG, B.-C. University of Georgia
GAVIRA, J.A. UAH
NG, J.D. UAH

Life in the Fast Lane for Protein Crystallization and X-Ray Crystallography—Abstract Only. For publication in the Process in Biophysics and Molecular Biology, 2004.

QUATTROCHI, D.A. SD60
LUVALL, J.C. SD60

Estimating Spatially Distributed Surface Fluxes in a Semi-Arid Great Basin Desert Using Landsat TM Thermal Data—Abstract Only. For publication in Thermal Remote Sensing in Land Surface Processes, 2004.

QUINN, J.E. TD51

Outbrief—Long Life Rocket Engine Panel—Final Paper. For presentation at the JANNAF Conference, Las Vegas, NV, May 10–13, 2004.

RAMACHANDRAN, N. BAE Systems/SD46
LESLIE, F.W. SD46

Magnetic Control of Solutal Buoyancy-Driven Convection. Part I: Theory and Experiments—Abstract Only. For publication in the International Journal of Heat and Mass Transfer, 2003.

RAMACHANDRAN, N. BAE Systems/SD46
LESLIE, F.W. SD46

Magnetic Control of Convection During Protein Crystallization—Abstract Only. For presentation at the International Conference on Crystal Growth, Grenoble, France, August 9–13, 2004.

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LESLIE, F.W. SD46

Using Magnetic Fields to Control Convection During Protein Cystallization—Analysis and Validation Studies—Abstract Only. For publication in the Journal of Crystal Growth, 2004.

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RAY, C.S. SD46
ROGERS, J.R. SD46

Developing Glassy Magnets From Simulated Composition of Martian Soil for Exploration Applications—Abstract Only. For presentation at and publication in Proceedings of the Material Research Society Materials for Space Applications, Boston, MA, November 29–December 3, 2004.

RAMIREZ-RUIZ, E. Institute for Advanced Study
GRANOT, J. KIPAC/Stanford University
KOUVELIOTOU, C. SD50
WOOSLEY, S.E. University of California
PATEL, S.K. USRA/SD50
MAZZALI, P.A. INAF
A Different Point of View Towards GRB 031203—Abstract Only. For publication in Nature, 2004.

RAMSEY, B.D. SD50
The X-Ray Polarimetry Explorer (XPE)—Abstract Only. For presentation at the X-Ray Polarimetry Conference, Stanford, CA, February 9–11, 2004.

RAMSEY, B.D. SD50
ELSNER, R.F. SD50
ENGELHAUPT, D. UAH
GUBAREV, M. USRA
KOLODZIEJCZAK, J.J. SD31
O'DELL, S.L. SD50
SPEEGLE, C.O. Raytheon/ITSS
WEISSKOPF, M.C. SD50
AS04-AS02-133 Electroformed-Nickel Hard X-Ray Optic Development at NASA/MSFC—Abstract Only. For presentation at and publication in Proceedings of SPIE Astronomical Telescopes & Instrumentation, Glasgow, Scotland, June 21–25, 2004.

RAMSEY, B.D. SD50
ELSNER, R.F. SD50
ENGELHAUPT, D. SD50
KOLODZIEJCZAK, J.J. SD50
O'DELL, S.L. SD50
SPEEGLE, C.O. SD50
WEISSKOPF, M.C. SD50
X-Ray Vision—Abstract Only. For publication in the OE Magazine, 2004.

RANASINGHE, K.S. University of Missouri-Rolla
RAY, C.S. SD46
DAY, D.E. University of Missouri-Rolla
ROGERS, J.R. SD46
HYERS, R.W. University of Massachusetts
RATHZ, T.J. UAH
Containerless Processing of a Lithium Disilicate Glass—Abstract Only. For publication in the Journal of Non-Crystalline Solids, 2004.

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WEI, P.F. Massachusetts Institute
KELTON, K.F. Washington University
RAY, C.S. SD46
DAY, D.E. University of Missouri-Rolla
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REID, R.S. TD40
Alkali Metal Heat Pipe Life Issues—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants, Pittsburg, PA, June 13–17, 2004.

REIS, S.T. University of Missouri-Rolla
KIM, C.W. University of Missouri-Rolla
BROW, R.K. University of Missouri-Rolla
RAY, C.S. SD46
Nucleation and Crystallization as Induced by Bending Stress in Lithium Silicate Glass Fibers—Abstract Only. For publication in Proceedings of the International Congress on Glass Conference, Sao Paolo, Brazil, September 21–25, 2003.

REIS, S.T. University of Missouri-Rolla
RAY, C.S. SD46
BROW, R.K. University of Missouri-Rolla
Deformation, Stress Relaxation, and Crystallization of Lithium Silicate Glass Fibers Below the Glass Transition Temperature—Abstract Only. For publication in the Journal of Materials Science, 2004.

RICHMOND, R.C. SD46
Multiparametric Determination of Radiation Risk—Abstract Only. For presentation at the NASA Cell Science Conference, Palo Alto, CA, February 26–28, 2004.

RICHMOND, R.C. SD46
Radiation Risk Assessment of the Individual Astronaut—A Complement to Radiation Interests at the NIH—Abstract Only. For presentation at the Invited Talk to National Institute of Health, Rockville, MD, April 19, 2004.

RICHMOND, R.C. SD46
CRUZ, A. SD46
BORS, K. SD46
Biodosimetry as a New Paradigm for Determination of Radiation Risks and Risk-Mitigation in Astronauts Exposed to Space Radiation—Abstract Only. For presentation at the 75th Annual Scientific Meeting, Anchorage, AK, May 2–6, 2004.

RICKMAN, D. SD60
LUVALL, J. SD60
MASK, P. SD60
SHAW, J. SD60
KISSEL, D.E. SD60
SULLIVAN, D. SD60

Precision Agriculture: Changing the Face of Farming—Abstract Only. For publication in Geotimes, November 2003.

RITCHIE, S.M.C. University of Alabama
LUO, Q. University of Alabama
CURTIS, S.S. University of Alabama
HOLLADAY, J.B. FD24
CLARK, D.W. FD24

New Hydrophilic, Composite Membranes for Air Removal From Water Coolant Systems—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

ROBERTS, B.C. ED44

Range Commanders Council Meteorology Group 88th Meeting—NASA Marshall Space Flight Center Task Report—2004—Final Paper. For presentation at the Range Commanders Council Meteorology Group 88th Meeting, Silver Springs, MD, May 10–12, 2004.

ROBERTS, B.C. ED44
KNUPP, K.R. UAH

Strong Updraft Feature Associated With Hurricane Earl During Landfall—Final Paper. For presentation at the 26th Conference on Hurricanes and Tropical Meteorology, Miami, FL, May 3–7, 2004.

ROBERTSON, B. ED13
WILKERSON, D. ED13

Multi-Level Simulation of a Real Time Vibration Monitoring System Component—Abstract Only. For presentation at the 7th Mil/Aerospace Applications of Programmable Logic Devices International Conference (MAPLD), Washington, DC, September 8–10, 2004.

ROBERTSON, F.R. SD60
LU, H.-L. USRA

How Consistent are Recent Variations in the Tropical Energy and Water Cycle Resolved by Satellite Measurements?—Abstract Only. For presentation at and publication in Proceedings of the IGWCO/GEWEX/UNESCO Workshop on Trends in Global Water Cycle Variables, Paris, France, November 3–5, 2004.

ROBERTSON, F.R. SD60
LU, H.-L. SD60

How Well are Recent Climate Variability Signals Resolved by Satellite Radiative Flux Estimates?—Abstract Only. For presentation at and publication in Proceedings of the 13th AMS Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–23, 2004.

ROBERTSON, F.R. SD60
ROADS, J. Scripps Institute
OGLESBY, R. SD60
MARSHALL, S. Duke University

Tropical Diabatic Heating and the Role of Convective Processes as Represented in Several Contemporary Climate Models—Abstract Only. For presentation at the 84th AMS Annual Meeting, Seattle, WA, January 11–15, 2004.

ROBERTSON, T. TD40
NORDLEY, G.D. Consultant

A Review of Past Insights by Robert L. Forward, Ph.D.: Emerging Technologies and Future Concepts—Final Paper. For presentation at the STAIF 2004 Conference, Albuquerque, NM, February 8–12, 2004.

ROBINSON, R.K. SD10

Hyperspectral Imaging on the *International Space Station*: An Innovative Approach to Commercial Development of Space—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

RODGERS, S. TD40

Monopropellant Research—Abstract Only. For presentation at the DIA Applied Technology Conference, Huntsville, AL, July 26–30, 2004.

RODRIGUEZ, P.R. ED20

NASA: Past, Present, and Future—Presentation. For presentation at the UniversidaDa Coruna, Campus De Elvina, La Coruna, Spain, 2003.

ROE, F.D. ED19
HOWARD, R.T. ED19
MURPHY, L. ED19

Automated Rendezvous and Capture System Development and Simulation for NASA—Final Paper. For presentation at the SPIE Defense and Security Symposium, Orlando, FL, April 12–16, 2004.

ROGERS, E. QTEC Inc.
HALE, J.P. VS30
ZOOK, K. QTEC Inc.
GOWDA, S. AMA Inc.
SALAS, A.O. Langley Research Center

Requirements Development for the NASA Advanced Engineering Environment (AEE)—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

ROGERS, J.H. QS40
SAFIE, F.M. QS40

STOTT, J.E. Hernandez Engineering
LO, Y. Hernandez Engineering
Application of Probabilistic Risk Assessment (PRA) During Conceptual Design for the NASA Orbital Space Plane (OSP)—Final Paper. For presentation at the International Conference on Probabilistic Safety Assessment and Management, Berlin, Germany, June 14–18, 2004.

ROGERS, J.R. SD46
COOK, B. SD46
MSFC Nuclear Propulsion Materials Development—Abstract Only. For presentation at the Tri-Lateral Alliance Collaborative Technical Forum, Chattanooga, TN, May 4–7, 2004.

ROL, E. SD50
VAN DER HORST, A.J. SD50
WIJERS, R.A.M.J. SD50
STROM, R. SD50
KAPER, L. SD50
KOUVELIOTOU, C. SD50
VAN DEN HEUVEL, E.P.J. SD50
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WIJERS, R.A.M.J. University of Amsterdam
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KAPER, L. University of Amsterdam
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WALSH, D. Precision Combustion
PERRY, J.L. FD21
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ROZANOV, A.Y. Paleontological Institute
HOOVER, R.B. SD50
Atlas of Bacteriomorphs in Carbonaceous Chondrites—Abstract Only. For presentation at and publication in Proceedings of SPIE Optical Science and Technology 48th Annual Meeting, San Diego, CA, August 3–8, 2003.

RUF, J.H. TD64
MCDANIELS, D.M. TD63
Experimental Results for an Annular Aerospike With Differential Throttling—Presentation. For presentation at the 5th International Symposium on Liquid Space Propulsion, Chattanooga, TN, October 27, 2003.

RUSSELL, C.K. ED33
CARTER, R. ED33
ELLIS, D.L. Glenn Research Center
GOUDY, R. Spin Tech
Friction Stir Welding of GR-Cop 84 for Combustion Chamber Liners—Final Paper. For presentation at the 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Palm Springs, CA, April 19–22, 2004.

SACKHEIM, R.L. DA01
Overview of Space Transportation and Propulsion at NASA—Presentation. For presentation at the 5th International Symposium on Liquid Space Propulsion, Chattanooga, TN, October 27–30, 2003.

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GEVEDEN, R.D. DA01
KING, D.A. DA01
The New National Vision for Space Exploration—Final Paper. For presentation at the 16th International Federation of Automatic Control Symposium on Automatic Control in Aerospace, St. Petersburg, Russia, June 14–18, 2004.

SACKHEIM, R.L. TD04
LONDON III, J.R. TD04
WEEKS, D.J. TD04
The Future for Small Launch Vehicles—Presentation. For presentation at the 2004 Small Payload Rideshare Conference, Anchorage, AK, May 11–13, 2004.

SCHAFER, C. TD40
MSFC Propulsion Research Center Overview—Abstract Only. For presentation at the DIA Applied Technology Conference, Huntsville, AL, July 26–30, 2004.

SCHLAGHECK, R.A. SD40
STAGG, E. Teledyne Brown Engineering
The NASA's Materials Science Research Program—Its New Strategic Goals and Opportunities—Abstract Only. For presentation at the 2nd International Symposium on Physical Sciences in Space Held Jointly With Spacebound 2004, Toronto, Ontario, Canada, May 23–27, 2004.

SCHNEIDER, J.A. Mississippi State University
BESHEARS, R. ED32
NUNES, JR., A.C. ED33
Computer Tomography 3-D Imaging of the Metal Deformation Flow Path in Friction Stir Welding—Abstract Only. For presentation at the TMS (The Minerals, Metals, and

Materials Society) Materials, Science and Technology 2004, New Orleans, LA, September 26–29, 2004.

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NUNES, JR., A.C. ED33
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NUNES, JR., A.C. ED33
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TEM Study of the FSW Nugget in AA2195-T81—Final Paper. For presentation at the ASM Materials Solutions 2004, Subdivision: International Conference on Joining of Advanced and Speciality Materials, October 18–21, 2004.

SCHNEIDER, T.A. ED31
MIKELLIDES, I.G. SAIC
JONGEWARD, G.A. SAIC
PETERSON, T. Glenn Research Center
KERSLAKE, T.W. Glenn Research Center
SNYDER, D. Glenn Research Center
FERGUSON, D. Glenn Research Center
Solar Arrays for Direct-Drive Electric Propulsion: Arcing at High Voltages—Abstract Only. For publication in the Journal of Spacecraft and Rockets, 2004.

SCHRAMM, F. CD30
The Need for Traceability—Presentation. For presentation at the AIAG 2004 Auto-ID Showcase Southfield, Detroit, MI, May 20, 2004.

SEGRE, P.N. SD46
Origin of Stability in Sedimentation—Abstract Only. For presentation at the Division of Fluid Dynamics 56th Annual Meeting, East Rutherford, NJ, September 23–25, 2003.

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MCCLYMER, J.P. University of Maine
Fluctuations, Stratification and Stability in a Liquid Fluidized Bed at Low Reynolds Number—Abstract Only. For publication in the Journal of Physics: Condensed Matter, 2004.

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Marangoni Convection and Deviations From Maxwells' Evaporation Model—Abstract Only. For publication in Physical Review Letters, 2004.

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SATURNO, W. SD60
IRWIN, D.E. SD60
Putting Us on the Map: Remote Sensing Investigation of the Ancient Maya Landscape—Abstract Only. For publication in Remote Sensing in Archaeology, 2004.

SEXTON, J. XP01
X-37 and Our Future in Space: Breaking Barriers to Achieve New Milestones in Space Settlement–Presentation (CD). For presentation at the AIAA Reusable Launch Vehicle Program Committee Meeting, Reno, NV, January 7, 2004.

SHAH, S.R. ED33
JERMAN, G. ED33
Wing Leading Edge Debris Analysis—Presentation. For presentation at the TMS 2004 Annual Meeting, Charlotte, NC, March 14–18, 2004.

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JERMAN, G. ED33
COSTON, J. ED33
Unlocking the Mystery of *Columbia*'s Tragic Accident Through Materials Characterization—Presentation. For presentation at the Mississippi State University Materials Working Group Seminar, Starksville, MS, October 15, 2003.

SHEETS, P. University of Colorado
SEVER, T. SD60
Creating and Perpetuating Social Memory Across the Ancient Costa Rican Landscape—Abstract Only. For publication in Remote Sensing in Archaeology, 2004.

SIBILLE, L. BAE Systems/SD46
GAVIRA-GALLARDO, J.A. SD46
HOURLIER-BAHLOUL, D. SD46
Synthesis of Sol-Gel Precursors for Ceramics From Lunar and Martian Soil Simulars—Abstract Only. For presentation at the 55th Pacific Coast Regional and Basic Science Division Fall Meeting, Oakland, CA, October 19–22, 2003.

SIMS, W.H. TD40
High Efficiency Microwave Power Amplifier (HEMPA) Design—Final Paper. For presentation at the International IPSI-2004, Pescara, Italy, July 28–August 2, 2004.

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PEARSON, J.B. TD40
Radio Frequency (RF) Trap for Confinement of Antimatter Plasmas Using Rotating Wall Electric Fields—Final Paper. For presentation at the 6th NASA/DOD Conference on Evolvable Hardware, Seattle, WA, June 24–26, 2004.

SINGH, N. UAH
KHAZANOV, G.V. SD50
Numerical Simulation of Waves Driven by Plasma Currents Generated by Low-Frequency Alfvén Waves in a Multi-Ion Plasma—Abstract Only. For publication in the Journal of Geophysical Research, 2003.

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SAHA, S. SD50
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Magnetized Plasma Expansion and its Interaction With a Plasma Stream—Abstract Only. For publication in the Journal of Geophysical Research, 2003.

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Overview of Future of Probabilistic Methods and RMSL Technology and the Probabilistic Methods Education Initiative for the U.S. Army at the SAE G-11 Meeting, Picatinny Arsenal—Abstract Only. For presentation at the SAE G-11 RMSL (Reliability, Maintainability, Supportability and Logistics) Division Meeting, Picatinny Arsenal, NJ, March 1–3, 2004.

SKELLEY, S.E. TD63
Inducer Hydrodynamic Forces in a Cavitating Environment—Final Paper. For presentation at the 2004 ASME Heat Transfer/Fluids Engineering Summer Conference, Charlotte, NC, July 11–15, 2004.

SMITH, D.D. SD46
Coherent Effects in Tiny Optics: Tunneling Through the Looking Glass—Abstract Only. For presentation at the Jet Propulsion Laboratory, Pasadena, CA, September 30, 2003.

SMITH, D.D. SD46
Coherence Effects in Coupled Optical Resonators—Abstract Only. For presentation at the 34th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 4–8, 2004.

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Coherence Phenomena in Coupled Optical Resonators—Abstract Only. For presentation at the Invited Talk to Oklahoma State University, Stillwater, OK, April 8, 2004, and publication in the Journal of Modern Optics, 2004.

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CHANG, H. UAH
Induced Transparency and Absorption in Coupled Microesonators—Final Paper. For presentation at the Institute of Electrical and Electronics Engineers—Lasers and Electro-Optics (IEEE-LEOS) Society Meeting, San Diego, CA, June 28–30, 2004.

SMITH, D.D. SD46
CHANG, H. UAH
FULLER, K.A. UAH
Photon Dynamics in Coherently Coupled Optical Resonators—Abstract Only. For presentation at the Optical Society of America Frontiers in Optics Conference, (OSA), Rochester, NY, October 10–14, 2004.

SMITHERMAN, JR., D.V. FD02
Technology Development and Demonstration Concepts for the Space Elevator—Abstract Only. For presentation at the 55th International Astronautical Congress, Vancouver, British Columbia, Canada, October 4–8, 2004.

SNELL, E.H. SD46
VAN DER WOERD, M.J. SD46
MILLER, M.D. SD46
DEACON, A.M. SD46
Finding a Cold Needle in a Warm Haystack: Infrared Imaging Applied to Locating Cryocooled Crystals in Loops—Abstract Only. For publication in the Journal of Applied Crystallography, 2004.

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ADAMS, J.H. SD50
AHN, H.S. University of Maryland
BASHINDZHAGYAN, G.L. Moscow State U.
BATKOV, K.E. Moscow State University
CHANG, J. Max Planck Institute
CHRISTL, M.J. SD50
FAZELY, A.R. Southern University
GANEL, O. University of Maryland
ET AL.
Albedo in the ATIC Experiment: Results of Measurements and Simulation—Abstract Only. For publication in Physics of Atomic Nuclei, 2004.

SORENSEN, K. TD05
Hyperbolic Injection Issues for MXER Tethers—Final Paper. For presentation at the AIAA Joint Propulsion Conference, Huntsville, AL, July 20–23, 2003.

SPANN, J.F. SD50
Challenges in Modeling the Sun-Earth System—Abstract Only. For presentation at the Spring AGU Meeting, 2004 Joint Assembly: AGU, the Canadian Geophysical Union (CGU) and the Society of Exploration Geophysicists, Montreal, Quebec, Canada, May 17–21, 2004, and at the GEM Workshop, Snowmass, CO, June 20–25, 2004.

SPANN, J.F. SD50
GERMANY, G. UAH/CSPAR
MADDOX, W. UAH/CSPAR
Winter Comparison of Auroral Images From Polar UVI and IMAGE FUV—Abstract Only. For presentation at and publication in Proceedings of The AGU 2004 Meeting, San Francisco, CA, December 13–17, 2004.

SPANN, J.F. SD50
KHAZANOV, G.V. SD50
MENDE, S.B. UCB
The Role of Auroral Imaging in Understanding Ionosphere-Inner Magnetosphere Interactions—Abstract Only. For presentation at and publication in Proceedings of the 30th Anniversary Yosemite Workshop Inner Magnetosphere Interactions, Yosemite, CA, February 3–6, 2004.

STAHL, H.P. SD70
Future Space Telescope Mirror Technology Requirements—Abstract Only. For presentation at and publication in Proceedings of the Frontiers in Optics 2004, The 88th Annual Meeting, Rochester, NY, October 10–14, 2004.

STAHL, H.P. SD70
FEINBERG, L.D. SD70
RUSSELL, J.K. SD70
TEXTER, S. Northrop Grumman
JWST Primary Mirror Material Selection—Abstract Only. For presentation at and publication in Proceedings of the Astronomical Telescopes and Instrumentation 2004 Scottish Exhibition and Convention Center, Glasgow, Scotland, June 21–25, 2004.

STAHL, H.P. SD70
LEISAWITZ, D.T. SD70
BENFORD, D.J. SD70
Mirror Requirements for SAFIR—Abstract Only. For presentation at and publication in Proceedings of the Astronomical Telescopes and Instrumentation 2004 Scottish Exhibition and Convention Center, Glasgow, Scotland, June 21–25, 2004.

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ROWELL, G.H. Tennessee State University
Ground-Based Telescope Parametric Cost Model—Abstract Only. For presentation at and publication in Proceedings of the Astronomical Telescopes and Instrumentation 2004 Scottish Exhibition and Convention Center, Glasgow, Scotland, June 21–25, 2004.

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ROWELL, G.H. Qualis Corporation
REESE, G. SAIC
BYBERG, A. Lockheed Martin
Multivariable Parametric Cost Model for Ground Optical Telescope Assembly—Abstract Only. For publication in Optical Engineering, 2004.

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SMITH, W.S. SD70
Mirror Requirements for SAFIR—Abstract Only. For presentation at From Spitzer to Herschel and Beyond: The Future of Far-IR Space Astrophysics, Pasadena, CA, June 7–10, 2004.

STANOJEV, B.J. TD40
HOUTS, M. Los Alamos National Laboratory
Deflection Measurements of a Thermally Simulated Nuclear Core Using a High-Resolution CCD-Camera—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants (ICAPP 2004), Pittsburg, PA, June 13–17, 2004.

STEEVE, B.E. ED22
KAPERNICK, R.J. Los Alamos National Laboratory
Design Development Analyses in Support of a Heatpipe-Brayton Cycle Heat Exchanger—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants, Pittsburg, PA, June 13–17, 2004.

STELLINGWERF, R.F. Stellingwerf Consulting
ROBINSON, J.H. Morgan Research Corporation
EVANS, S.W. ED31
STALLWORTH, R. ED31
HOVATER, M. ED31
Foam-On-Tile Impact Modeling for the STS-107 Investigation—Final Paper. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

STELLINGWERF, R.F. Stellingwerf Consulting
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EVANS, S.W. ED31
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Foam on Tile Impact Modeling for the Space Shuttle Program—Abstract Only. For presentation at the 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 5–8, 2004.

STERLING, A.C. SD50
CME Eruption Onset Observations From EIT and SXT—Abstract Only. For presentation at the Solar, Heliosphere and Interplanetry (SHINE) Workshop, Big Sky, MT, June 28–July 1, 2004.

STERLING, A.C. SD50
Solar Spicules: Prospects for Breakthroughs in Understanding With Solar-B—Abstract Only. For presentation at the 35th COSPAR Scientific Assembly, Paris, France, July 18–25, 2004.

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X-Ray and EUV Observations of CME Eruption Onset—Abstract Only. For presentation at the International Astronomical Meeting Symposium 226, Coronal and Stellar Mass Ejections, Jeijing, China, September 13–17, 2004.

STERLING, A.C. SD50
MOORE, R.L. SD50
External and Internal Reconnection in Two Filament-Carrying Magnetic-Cavity Solar Eruptions—Abstract Only. For publication in The Astrophysical Journal, 2004, and presentation at the 204th Meeting of the American Astronomical Society, Denver, CO, May 30–June 3, 2004.

STORRIE-LOMBARDI, M.C. Kinohi Institute
HOOVER, R.B. SD50
Fossil Signatures Using Elemental Abundance Distributions and Bayesian Probabilistic Classification—Abstract Only. For presentation and publication in Proceedings of SPIE Optical Science and Technology 49th Annual Meeting, Denver, CO, August 2–6, 2004.

SU, C.-H. SD46
LEHOCZKY, S.L. SD46
LI, C. UAB
KNUTESON, D. BAE Systems
RAGHOTHAMACHAR, B. SUNY
DUDLEY, M. SUNY
SZOKE, J. Admatis Ltd.
BARCZY, P. University of Miskolc
Crystal Growth of CdTe by Gradient Freeze in Universal Multizone Crystallizator (UMC)—Abstract Only. For presentation at the 4th International Conference on Solidification and Gravity, Miskolc, Hungary, September 6–10, 2004.

SUESS, S.T. SD50
The Magnetic Field in the Outer Heliosphere—Abstract Only. For presentation at and publication in Proceedings of the IGPP 3rd Annual International Astrophysics Conference, Riverside, CA, February 9, 2004, and presentation at the Arcetri Astrophysical Observatory, Florence, Italy, April 29, 2004.

SUESS, S.T. SD50
BEMPORAD, A. SD50
POLETTO, G. SD50
A Slow Streamer Blowout at the Sun and Ulysses—Abstract Only. For publication in Geophysical Research Letters, 2003, and presentation at the Ulysses Science Working Team Meeting, Noordwijk, The Netherlands, April 22–23, 2004.

SUESS, S.T. SD50
NERNEY, S. Ohio University
Flow in Streamer Boundaries, and Streamer Stability—Abstract Only. For publication in Advances in Space Research, 2004.

SUESS, S.T. SD50
POLETTO, G. SD50
A Detection of the Same Hot Plasma in the Corona—During a CME—and Later at Ulysses—Abstract Only. For presentation at and publication in Proceedings of The American Geophysical Union 2004 Fall Annual Meeting, San Francisco, CA, December 13–17, 2004.

SUGGS, R.J. SD60
JEDLOVEC, G.J. SD60
HAINES, S.L. UAH
Near Real-Time Derived Products From MODIS—Abstract Only. For presentation at the 13th Conference on Satellite Meteorology and Oceanography, Norfolk, VA, September 20–24, 2004.

SUGGS, R.M. ED44
How to Do Science in an Engineering Organization—Abstract Only. For presentation at the New Mexico State University, Las Cruces, NM, October 3, 2003.

SWARTZ, D.A. SD50
DRAKE, J.J. SD50
ELSNER, R.F. SD50
GHOSH, K.K. SD50
GRADY, C.A. SD50
WASSELL, E. SD50
The Herbig Ae Star HD 163296 in X-Rays—Abstract Only. For publication in The Astrophysical Journal, 2004.

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TENNANT, A.F. SD50
WU, K. SD50
The Ultra-Luminous X-Ray Source Population From the Chandra Archive of Galaxies—Abstract Only. For publication in The Astrophysical Journal, 2004.

SWIFT, W.R. ED44
SUGGS, R.M. ED44
COOKE, W.J. Morgan Research Corporation/ED44
Meteor Video Meteor Photometry—Abstract Only. For presentation at the Meteoroids 2004 Conference, London, Ontario, Canada, August 16–20, 2004.

SWINGLE, M.R. University of South Alabama
CISZAK, E.M. UAH/SD46
HONKANEN, E. University of South Alabama
Structural Basis for the Catalytic Activity of Human Serine/Threonine Protein Phosphatase Type 5 (PP5)—Abstract Only. For publication in Science, 2004, and in the Journal of Biological Chemistry, 2004.

TATARA, J.D Qualis Corporation
PERRY, J.L. FD21
Spacecraft Cabin Atmospheric Major Constituent Monitoring Using Off-the-Shelf Techniques—Final Paper. For presentation at the 34th International Conference on Environmental Systems, Colorado Springs, CO, July 19–22, 2004.

TAYLOR, J. Austin Peay State University
RAKOCZY, J. SD71
STEINCAMP, J. SD71
Genetic Algorithm Phase Retrieval for the Systematic Image-Based Optical Alignment Testbed—Abstract Only. For publication in the Astronomical Society of the Pacific, 2004.

TAYLOR, T.L. XP01
X-37 Flight Demonstrator—Approach & Landing Test Vehicle Flight Test Approach—Presentation. For presentation at the Space Technology and Information International Technology Forum (STAIF), Albuquerque, NM, February 11, 2004.

THORNTON, G. SD70
The Use of Solid Edge as an Engineering Tool to Support NASA Projects—Abstract Only. For presentation at the Solid Edge User Summit, Orlando, FL, June 2–4, 2004.

TINKER, M.L. ED20
STEINCAMP, J.W. ED20
STEWART, E.T. ED20
PATTON, B.W. ED20
PANNELL, W.P. ED20
NEWBY, R.L. ED20
COFFMAN, M.E. ED20
KOS, L.D. ED20
Nuclear Electric Vehicle Optimization Toolset (NEVOT)—Final Paper. For presentation at the AIAA/SSMO Multidisciplinary Analysis and Optimization Conference, Albany, NY, August 30–September 1, 2004.

TINKER, M.L. ED20
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PATTON, B.W. ED20
PANNELL, W.P. ED20
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QUALLS, A.L. Oak Ridge National Laboratory
BANCROFT, S. Arnold Engineering
MOLVIK, G. Arnold Engineering
Nuclear Electric Vehicle Optimization Toolset (NEVOT): Integrated System Design Using Genetic Algorithms—Final Paper. For presentation at the Space Technology and Applications International Forum (STAIF 2004), Albuquerque, NM, February 8–12, 2004.

TUCKER, D.S. SD71
ETHRIDGE, E.C. SD71
SMITH, G.A. UAH
Low Gravity Rapid Thermal Analysis of Glass—Abstract Only. For presentation at the XX International Congress on Glass, Kyoto International Conference Hall, Kyoto, Japan, September 26–October 1, 2004.

TUCKER, D.S. SD71
SMITH, G.A. UAH
The Effects of Gravity on the Crystallization Behavior of Heavy Metal Flouride Glasses—Abstract Only. For publication in the Progress in Materials Science (Book Chapter), 2004.

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WEST, J. TD64
WILLIAMS, R. TD64
LIN, J. TD64
ROCKER, M. TD64
CANABAL, F. TD64
ROBLES, B. TD64
GARCIA, R. TD64
CHENOWETH, J. CRAFT Tech
Using CFD as a Rocket Injector Design Tool: Recent Progress at Marshall Space Flight Center—Final Paper. For presentation at the 5th International Symposium on Liquid Space Propulsion Long Life Combustion Devices Technology, Chattanooga, TN, October 27–30, 2003.

TURNER, M.B. University of Alabama/SD46
HOLBREY, J.D. University of Alabama
SPEAR, S.K. University of Alabama
PUSEY, M.L. SD46
ROGERS, R.D. University of Alabama/SD46

Effect of Oxygen-Containing Fuctional Groups on Protein Stability in Ionic Liquid Solutions—Abstract Only. For publication in the American Chemical Society Symposium Series Book, 2004.

TURNER, S. XP01
X-37 Project Lessons Learned: Maximizing Knowledge to Improve Space Transportation System Development—Presentation. For presentation at the NASA Academy of Program and Project Leadership, Baltimore, MD, August 9–11, 2004.

TURPIN, J.B. TD53
Variable Step Integration Coupled With the Method of Characteristics Solution for Water-Hammer Analysis, A Case Study—Final Paper. For presentation at the 52nd JANNAF Meeting/1st Liquid Propulsion Subcommittee Meeting, Las Vegas, NV, May 10–13, 2004.

VALENTINE, P.G. ED34
MEYER, D. ED34
SNOW, H. ED34
Hot Structure Control Surface Progress for X-37 Technology Development Program—Abstract Only. For publication in Aerospace America, 2004.

VAN DER WOERD, M.J. SD46
DNA in a Tunnel: A Comfy Spot for Recognition—or The Structure of BsoBI complexed With DNA—What Can We Learn About Function Via Structure Determination and How Can This Be Applied to Bone or Muscle Biology?—Abstract Only. For presentation at an Invited Talk at Johnson Space Center, Houston, TX, March 26, 2004.

VAN DYKE, M.K. TD40
Early Flight Fission Test Facilities (EFF-TF) to Support Near-Term Space Fission Systems—Final Paper. For presentation at the STAIF 2004 Conference, Albuquerque, NM, February 8–12, 2004.

VAN DYKE, M.K. TD40
MARTIN, J.J. TD40
Non Nuclear Testing of Reactor Systems in the Early-Flight Fission Test Facilities (EFF-TF)—Final Paper. For presentation at the 2004 International Congress on Advances in Nuclear Power Plants (ICAPP 2004), Pittsburg, PA, June 13–17, 2004.

VAN PELT, M. ESA-ESTEC
HUNT, C.D. TD31
Comparing NASA and ESA Cost Estimating Methods for Human Mission to Mars—Abstract and Final Paper. For presentation at The International Society of Parametric Analysts 26th International Conference, Frascati, Italy, May 10–12, 2004.

VAUGHAN, W.W. UAH
ANDERSON, B.J. ED44
Aerospace Meteorology Lessons Learned Relative to Aerospace Vehicle Design and Operations—Final Paper. For presentation at the 11th AMS Conference on Aviation, Range, and Aerospace Meteorology, Hyannis, MA, October 4–8, 2004.

VAUGHN, J.A. ED31
CURTIS, L. ED31
GILCHRIST, B.E. University of Michigan
BILEN, S. Pennsylvania State University
LORENZINI, E. Smithsonian Astrophysics
Review of the ProSEDS Electrodynamic Tether Mission Development—Abstract Only. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.

VAUGHN, J.A. ED31
SCHNEIDER, T.A. ED31
POLK, J. Jet Propulsion Laboratory
GOEBEL, D. Jet Propulsion Laboratory
OHLINGER, W. Consultant
HILL, D.N. Georgia Institute of Technology
NEXIS Reservoir Cathode 2000 Hour Life Test—Abstract Only. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Fort Lauderdale, FL, July 11–14, 2004.

VINE, F.J. Accurate Automation
MANKOWSKI, J.J. Accurate Automation
SAEKS, R.E. Accurate Automation
CHOW, A.S. TD40
Plasma Shock Wave Modification Experiments in a Temperature Compensated Shock Tube—Final Paper. For presentation at the JANNAF Conference, Colorado Springs, CO, December 1–5, 2003.

VOLZ, M.P. SD46
Semiconductor Crystal Growth in Static and Rotating Magnetic Fields—Abstract Only. For publication in Proceedings of the International Workshop on Materials Analysis & Processing in Magnetic Fields, Tallahassee, FL, March 7–10, 2004, and for presentation at The International Workshop on Materials Analysis and Processing in Magnetic Fields, Tallahassee, FL, March 17–19, 2004.

VOLZ, M.P. SD46
WALKER, J.S. University of Illinois
SCHWEIZER, M. USRA/SD46/Schott Glas
COBB, S.D. SD46

SZOFRAN, F.R. SD46
Bridgman Growth of Germanium Crystals in a Rotating Magnetic Field—Abstract Only. For presentation at the International Conference on Crystal Growth 14, Grenoble, France, August 9–13, 2004.

WACHTER, S. SD50
KOUVELIOTOU, C. SD50
PATEL, S.K. SD50
TENNANT, A.F. SD50
WOODS, P.M. SD50
EICHLER, D. SD50
LYUBARSKY, Y. SD50
BOUCHET, P. SD50
The Precise Location of the Soft Gamma Repeater SGR 1627-41 With Chandra—Abstract Only. For publication in The Astrophysical Journal, 2003.

WANG, T.-S. TD64
Transient Two-Dimensional Analysis of Side Load in Liquid Rocket Engine Nozzles—Final Paper. For presentation at the 40th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004, and publication in the AIAA Journal of Propulsion and Power, 2004.

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Multidimensional Unstructured-Grid Liquid Rocket Engine Nozzle Performance and Heat Transfer Analysis—Final Paper. For presentation at the 40thAIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Fort Lauderdale, FL, July 11–14, 2004, and for publication in the AIAA Journal of Propulsion and Power, 2004.

WATSON, M.D. ED12
ASHLEY, P.R. U.S. Army AMRDEC
ABUSHAGUR, M. Rochester Institute of Tech.
Modeling of Optical Waveguide Poling and Thermally Stimulated Discharge (TSD) Charge and Current Densities for Guest/Host Electro Optic Polymers—Final Paper. For publication in the IEEE Journal of Quantum Electronics, 2004.

WATSON, M.D. ED12
MINOW, J. ED12
ALTSTATT, R. Jacobs Sverdrup
WERTZ, G.E. ED12
SEMMEL, C.L. Qualis Corporation
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